THE NATURE OF RESIDENTIAL GROWTH IN METROPOLITAN AREAS

by

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SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER IN
CITY PLANNING
at the
MASSACHUSETTS INSTITUTE OF
TECHNOLOGY

June 9, 1961

Signature of Author.....
Department of City and Regional Planning, May 20, 1961

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ABSTRACT

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Edward W. Wood, Jr.

Submitted to the Department of City and Regional Planning on May 20, 1961 in partial fufillment for the degree of Master in City Planning

In order to analyze the nature of residential growth in metropolitan areas, a conceptual framework based upon the scale of analysis, the distribution of variables within this scale, and the process of change as defined by time is developed. Criterion are developed within this framework for judging the adequacy of the theoretical statements concerning the nature of residential growth made by Homer Hoyt, Edgar Hoover and Raymod Vernon, and Walter Firey.

These theoretical statements are tested in terms of the criterion in the Philadelphia Standard Metropolitan Area. Upon the basis of the test a combined theoretical statement is developed which utilizes the insights of the several theorists. This combined statement indicates that the distribution of residential space in the Philadelphia metropolitan area is best described at several different scales of analysis. Access to work sets the scale within which the several physical and socio-economic variables are distributed. These variables may or may not be homogenous at the same scales.

The process by which residential space is being distributed in the metropolitan area consists of invasiom-succession working through the housing market, as modified by government action. The major variables involved in this process are: access to work, rising incomes, age structure of the family, and racial characteristics. Minor variables are topography, amount of vacant land, government action, the nature of the housing supply, ethnic and class considerations, and leisure. These variables are all contained within a cultural context which structures them.

LETTER OF TRANSMITTAL

175 Chestnut Street
Cambridge, Mass.
May 20, 1961

Professor John T. Howard
Department of City and Regional Planning
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Professor Howard:

In partial fulfillment for the degree of Master in City Planning, I submit this thesis entitled "The Nature of Residential Growth in Metropolitan Areas."

Sincerely,

Edward W. Wood, Jr.

ACKNOWLEDGEMENTS

I would like to take this opportunity to express my sincere gratitude to the Sears Fellowship Fund. This assistance has been of inestimable aid to myself and my family while being at the Massachusetts Institute of Technology. I would also like to thank those members of the staff who have aided me with my thesis, particularly Professor Rodwin. It was at his suggestion that this subject was selected for investigation and his advice was especially helpful in reformulating and clarifying the basic approach. Thanks are also owed to Louis Loewenstein and W. B. Hansen of the University of Pennsylvania who made available unpublished material.

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INTRODUCTION

The problem to be examined in this thesis is the distribution of residential space in metropolitan areas with particular attention devoted to the relationship between the variables affecting this distribution. Appendix A contains a summary of a selected number of theoretical approaches to this problem. These theories have differed in their statements concerning the nature of the pattern of distribution as well as in their definition of the variables bringing it about.

This thesis will test these several approaches as they apply to one metropolitan area in order to determine:

a. That one approach or that combination of approaches which best describes and explains the pattern of the distribution of residential space in one metropolitan area.

b. The policy implication which follow from this approach or combination of approaches.

To achieve these objectives the thesis has been divided into two parts. This division is based upon the nature of the material. The summary of the several theories, the methodology of the test, and the test material involve an extremely detailed discussion of a large body of data. In contrast, the construction of a conceptual framework useful for analyzing this data, the statement of a series of criterion required to judge the adequacy of the theoretical approach in terms of the test, the development of hypotheses needed to structure the test, the conclusions reached about one approach or combination of approaches, and the implications for policy contain greater abstraction: they utilize the body of

detailed data for illustrative purposes. Consequently this data has been summarized in a set of Appendices while the main body of the thesis consists of more general discussion which refers to these Appendices for supporting evidence. In detail, these theoretical considerations and the Appendices are organized as follows:

I. Theoretical considerations.

Chapter I: A Framework for Analysis.

A conceptual framework for comparing and contrasting the several theories is developed. This framework is used to analyze their content, to develop the criterion for judging their adequacy, and to aid in the construction of the methodology of the test.

Chapter II: Theoretical Implications.

Based upon the adequacy of the various approaches as determined by the criterion developed in Chapter I and the test material contained in Appendix C, that approach or combination of approaches which best describes and explains the distribution of residential space in one metropolitan area is developed.

Chapter III: Policy Implications.

Implications for policy are deduced from this approach or combination of approaches.

CHAPTER ONE

General Considerations

A. Construction of a Conceptual Framework

The subject matter of this thesis is a complex web of interacting variables which work upon each other in a variety of ways. Many men have devoted long periods of time to disentangling this web. Their several attempts to obtain clarification have, unfortunately, only increased confusion. As each has come to understand one variable, he has generalized from it to a particular theory so that, now, the problem is not merely to unravel the complexity of the subject matter but also the differences between the several theories.

Before approaching this problem, an analytical tool for comparing and contrasting the several theories is required. Without such a conceptual framework, it is impossible to relate the variables to each other in any logical fashion.[1] This framework consists of those formal concepts which are common to each approach and which each utilizes in analyzing the distribution of residential space in metropolitan areas. The nature of these concepts is such that they are also inherent in the subject matter. Theycconsist of:

1. A particular scale of analysis.

   Each approach outlined in Appendix A discusses the distribution of residential space in terms of some particular scale of analysis. With Homer Hoyt this scale is the city as defined by municipal boundaries and the sector-rental area within this scale; with Raymond Vernon and Edgar Hoover it is the metropolis as defined by counties and the rings-access zones within this scale; with Firey it is the neighborhood unit as defined ecologically.

2. The distribution of a particular set of variables within this scale.

   Each theoretical approach examines a particular set of variables within its scale. These variables are defined differently by the several approaches.

3. A particular period of time.

   The distribution of residential space in metropolitan areas can - and has - been examined at different time periods. Some approaches choose a fixed moment in time and conduct a static analysis; others consider time dynamically and deal with those variables bringing about change.

4. Implications for planning policy.

   Each theoretical approach - either explicitly or implicitly - contains specific recommendations for policy.

These are the concepts which form the framework for analyzing both the distribution of residential space in metropolitan areas and the theories concerned with this distribution. Space cannot be considered apart from them for they are inherent to it: it is impossible to think of space without considering a particular scale - whether it be the individual household or the whole metropolis; a particular set of variables within this scale - whether they be the aesthetic relation between the buildings or the functional activities of people; a particular time period - whether it be fixed or stretch back into the fartherest reaches

of history; and particular implications for policy - whether they be stated or implied.

Moreover, no other concepts are needed to form the framework required for analysis.[2] All variables pertaining to the use of residential space in metropolitan areas can be contained within it in such a way that they neither stretch it beyond meaning nor pervert reality.

Before attempting to use these concepts it is important to realize the distinction between them. The scale of the analysis and the distribution of variables within this scale are purely spatial concepts and, as such, cannot be separated from each other in reality. However, they should be kept conceptually distinct: the scale of analysis may have an important impact upon the relationships between the variables.

For example, Peter Rossi in Why Families Move[3] states that "little weight can be given to these location factors (journey to work)," in determining the mobility inclinations of households. His scale of analysis is the neighborhood in central Philadelphia as defined by the census tract. Within this scale, particularly in a central city, accessibility to work may not have much influence upon a houshold's decision to move. At the metropolitan scale of analysis, however, this variable has a more important meaning. In Philadelphia, most households tend to locate within 30 to 39 minutes of their work.[4] Given the system of transportation, this time-distance rules out many areas of the metropolis for large number of households.

Consequently, it should not be assumed that the impact of a variable at one scale of analysis remains constant at all scales. Its importance can shift from scale to scale.

The third concept - time - developed in the conceptual framework introduces another and new dimension. The instant a particular time period is defined, the nature of the analysis changes: the pattern of distribution of residential space is no longer fixed but shifts in this pattern occur. The shifts result from the interaction of a particular set of variables through time. There is a distinction between the variables and the process through which they interact. For example, both Hoyt and Vernon-Hoover accept the process of invasion-succession while positing different variables as being involved in this process. This distinction between process and the variables, strategic in the process, is a conceptual difference of much importance in analyzing change: the process of change may remain constant through time while the variables involved in this process differ through time.

Thus, space and time, as defined in this thesis constitute a formal framework within which a particular set of variables are distributed and a particular process of change is occuring.[5] Consequently, neither can be considered as variables in themselves but rather as dimensions useful for the purposes of analysis, reflecting both reality and theory.

The fourth concept - implications for planning policy - exists at another level. Its emphasis is upon the decision-making process. If, for example, access to work is the most important variable determining the use of residential space at the metropolitan scale, then the locations of places of work and the means of reaching them are the strategic elements in developing a planning policy. If, on the other hand, access to

work is becoming less important as the means of transportation improve and incomes rise, then other elements in the physical environment become more strategic.

By utilizing all these concepts in an analytical framework, it is possible to determine the content of each theoretical approach as well as its relationship to all others. Within it, criteria can be developed for judging the adequacy of each theoretical approach, methodological problems stated, and a test constructed. It is a tool for studying both the distribution of residential space and the theories concerning it.

B. Selection of Theoretical Statements

This conceptual framework also indicates a basis for selecting the particular theories to be examined in the test. Though a test could be constructed which would involve all theories, it would probably become so complex that it would be difficult to manage. A selected number of theories can be handled more easily and, if chosen with care, can point to the problems inherent in the other theoretical approaches.

These theories must be selected so that they clearly illustrate differences in scale; the variables distributed within this scale; the variables and the process hypothesized as bringing about changes through time; and policy implications. They should also be as broad as possible so that they contain many of the variables posited by the other theories.

A careful analysis has indicated that the approaches of Homer Hoyt, Edgar Hoover and Raymond Vernon, and Walter Firey best meet these criteria. They not only contrast in their substantive development of the concepts,

they also imply major elements in the other theoretical approaches. Hoyt's emphasis upon the role of the housing market includes both land economists and housing specialists. Vernon's and Hoover's the life-cycle theory, the concentric-ring theory, recent studies concerned with rising incomes, ecological considerations, and various theories of accessibility; Firey's the cultural variable as it has been hypothesized by various sociologists. Each of these approaches is summarized in Appendix A in terms of the conceptual framework.

C. Criterion required to Judge the Adequacy of the Theoretical Statements. The Nature of The Test Itself.

Before turning to a test of the approaches, it is necessary to:

a. Clearly define their differences and similarities.

b. Articulate the criteria for judging the adequacy of each approach in terms of the test.

c. State the hypotheses which are to be tested.

d. Construct the test.

The conceptual framework just developed will be utilized to organize the discussion. Data will be abstracted from Appendix A and Appendix B as required. For a detailed statement concerning the content of the theories and the methodology of the test reference should be made to them.

1. Scale of Analysis:

Each approach - as summarized in Appendix A - has used a different scale of analysis in studying the distribution of residential space in metropolitan areas. The differences between these scales points to serious methodological problems inherent in any study of residential

space in metropolitan areas. These problems become particularly obvious when Hoyt's "rental areas," defined by sectors, are contrasted with Vernon-Hoover's rings and access zones.

Hoyt based his original analysis upon average block rents then regrouped these blocks into three broad categories: high, intermediate, and low. In so doing, he claimed that he only smoothed out discrepancies in the data: the pattern defined by the broad categories resembled that of the finer categories, less unimportant detail. Vernon-Hoover made their analysis at the smaller scale but they also organized their data in terms of a larger scale: the county and/or access zones at 15 minute intervals to Manhattan.

In both cases it is a question whether such regrouping smooths out essential differences in the data so that neither sectors nor access zones really possess the homogeneity alloted to them. It is this question which concerned Firey and lead him to the conclusion that, "land use is apparently too variable to be conceived of in terms of two-dimensional cartographic generalizations."[6] Consequently, he held his analysis to the scale where he felt unity existed: the ecological neighborhood.

The several theories also analyzed the metropolis at different overall scales. Though Firey rejected the metropolitan scale for final analysis, he did use it in his original search for a pattern. Vernon-Hoover used it consistently while Hoyt, in contrast, was restricted by his data to the municipal boundaries of central cities. All of Hoyt's conclusions are therefore limited by these artificial boundaries. In order to adequately compare them to those reached by the other analysts, their scale must be utilized.[7]

For each of the approaches it is also difficult to arrive at any precise definition of the scale of analysis which is used. For Hoyt, sectors varied according to each individual city studied but the major elements consistent to any sector wherever located were a fairly homogenous pattern of housing, grouped along a radial extending outward from the core, and capable of outward expansion. The major indices for defining this pattern consisted of rent and social status. Consequently, it is impossible to establish any precise boundaries for a sector in the abstract: its definition for a particular area can only be determined by its position in the larger context of the whole metropolitan region.

Similar imprecision exists in the Vernon-Hoover concentric ring hypothesis. A core and two rings are defined but these, in turn,are refined into inner and outer portions, giving a total of six rings in all. These are demarcated from each other by the indices of socio-economic characteristics and housing indicated in Appendix A, p.vii. At no point is a clear boundary established between these rings: rather, they fade into each other.

Vernon Hoover's definition of access zones is decidedly more precise. They are defined by 15 minute time-distance intervals from Manhattan.

Firey's scale of detailed analysis is also difficult to determine outside the context of a particular metropolitan area. Its indices are the cultural and social homogeneity of a particular sub-cultural system, such as a class, an ethnic or racial group. To adequately define the geographic area which the group has endowed with symbolic meaning, it is first necessary to articulate its values.

The use of these various scales points to a particular problem raised earlier in this chapter: the scale utilized must be flexible enough to reflect any changes in the relationships between the variables at different scales. That is, at the metropolitan scale access to work may be the determining factor, at the neighborhood scale, certain qualities of the environment, and at the household scale, the particular space and design of the dwelling unit. No approach can posit one of these as meaningful without considering the shifting relationship between the variables at different scales.

Consequently, any theoretical statement about the distribution of residential space in metropolitan areas must meet these criteria as far as scale is concerned: a) organize the data at a scale which is not so gross that it implies a homogeneity where none exists; b) organize the data at a scale which is not so small it misses any implications of homogeneity; c) determine that scale which most effectively reflects the distribution of residential space - whether it be the sector, the concentric ring, some other pattern, or the lack of pattern posited by Firey; d)approach the data from the scale of the metropolis;[8] e) determine whether the variables change their relationships at different scales of analysis.

2. The distribution of the variables within this scale of analysis.

The material summarized in Appendix A indicates that each analysis has been concerned with a large number of variables as indices of the pattern of the distribution of residential space in metropolitan areas. A survey of this material shows that no one approach has studied all the

variables involved in this distribution. For example, the levels of service to the physical environment - i.e. utilities, garbage collection, etc., have been neglected. To be complete, any theoretical statement concerning the distribution of residential space should contain all variables important to this distribution.

3. Time.

Appendix A contains a detailed summary of the way each approach has defined changes through time. Intrinsic differences as well as certain similarities exist in these definitions. Differences and similarities involve both variables and process of change. For Hoyt the variables involved in the process are summarized in his 11 hypotheses which are listed in Appendix A. The essential variables contained in these hypotheses are: the system of transportation; topography; the mutual exclusion of low, intermediate and high rental areas based upon a rigidly defined class and caste system; the "pull" of high rental areas which move in one direction for a long time and are followed by intermediate rental areas; the role of the "leaders of the community" in determining the movement of these high-rent areas; the impact of residential promoters. These variables work together to cause the movement of high-rental areas in a specific direction and this movement largely determines the distribution of residential space in the urban area.

Vernon-Hoover also emphasizes topography and the system of transportation. Topography has a somewhat similar impact but the importance of the system of transportation is defined in terms of access to work.

Other variables hypothesized by this study as indicated in Appendix A: are: rising incomes; age structure of the family; changing patterns of access; racial and ethnic characteristics; government action; the housing supply; and leisure. In essence, the major variables are analyzed in functional terms. That is, households perform certain functions, particularly those of work, raising children, and leisure. The way these functions are performed is conditioned by the socio-economic status of the household. These conditioned functions determine the demand schedule for residential space in metropolitan areas and this demand schedule is the most important element in the way this space is distributed, though other variables have an impact as well.

Some emphasis is placed upon the class and caste system but that system does not possess the rigidity hypothesized to it by Hoyt. It is not the "pull" of high rental areas which determines the use of residential space but the functional requirements of households in reference to space. Though segregation of groups does occur in terms of class and caste, that segregation is less the result of societies' forcing such segregation as it is the will of the groups involved. Evidence is adduced to indicate that even for negroes forced patterns of residence may be losing some of their restrictions.

Firey - in contrast to both Hoyt and Vernon-Hoover - hypothesizes only one variable as being important in bringing about the distribution of the variables and change in this distribution through time. This is the cultural component. "It is central to locational processes. Only in terms of this component can we fully understand why land is put to the uses to which it is."[9] The meaning of the other variables comes from the

culture in which they exist. Moreover, space assumes a particular symbolical nature based upon the cultural component. This symbolism accounts for the overall lack of pattern in the distribution of residential space, the grouping of classes and ethnic and racial groups, as well as uneconomic and diseconomic uses. It also tends to explain locational patterns which cannot be understood in terms of "friction of space" or accessibility.

The second area in which differences and similarities concerning change through time are found consists of the process through which the variables interact with each other. Both Hoyt and Vernon-Hoover resemble each other in that invasion-succession, working through the housing market, is accepted. However, the housing market, as defined by Vernon-Hoover differs from that stated by Hoyt. It is conditioned by actions of government, particularly subsidized housing, urban renewal, and zoning. In contrast, Hoyt's housing market is laissez-faire. Invasion-succession also is qualified by Vernon-Hoover. Though the mechanism is accepted, it does not occur as with Hoyt by one group shifting outward into the residential area of the group next to it. Instead a considerable amount of "leapfrogging" occurs wherein a group near the center will move a considerable distance into the periphery.

Both differ considerably in defining the role of the regional core in the process of change. Though Hoyt discusses it in passing, it is the system of radials stretching outward from the core that determine locational patterns. For Vernon-Hoover, however, the core is a controlling feature in the distribution of residential space. Its position is based upon the high concentration of jobs within it. Given the occupational

structures corresponding to these jobs and the time-distance which the various occupations are willing to commute, the location of those heads of households who work in the core is restricted by a particular radius.

For Firey the process of change is intimate to the cultural system of the society. The values posited by this system give space a symbolical meaning and that meaning serves as a force in itself, retaining, attracting, dispelling certain socio-economic populations. This process is so detailed and exists in such variety that no overall pattern of the distribution of residential space occurs in the metropolitan area.

The problem for the thesis, in reference to both factors involved in change through time is: a) whether the variables play the parts stated by the analyst, some other part, or no part at all; b) whether there are other variables not discussed; c) whether the process resembles the one stated by the analyst or some other process exists. The criterion for judging which of these relationships holds true can only be that the statement made by the analyst be upheld in the test or that some other relationship be shown.

By so separating the scale of the analysis, the distribution of the variables within this scale, and the process of change through time, it becomes possible to determine if an analyst has correctly hypothesized one of these while being mistaken in the others. For example, Hoyt might be correct in defining growth in terms of a sector but in error in his definition of class and caste while Vernon-Hoover might be mistaken in accepting the concentric theory but present fruitful insights in hypothesizing access to work, age structure of the family, and rising incomes as the important variables involved in change.

Using the concept time separately also points to the possibility that the relationship between the variables may change through time while the process remains constant or the process changes while the variables remain constant. For example, in the late 1930's, when Hoyt prepared his study, the housing market was a different institution than it was today. Consequently, it was impossible to hypothesize the impact of government action upon this market. Any theoretical statement concerning the distribution of residential space in metropolitan areas must explore the role of such changes in variables on process through time.

4. Implications for Policy.

Neither Hoyt nor Vernon-Hoover are directly concerned with policy statements. As indicated in Appendix A, such policy statements are only implied. The interesting fact about their approaches is this tendency to state trends as inexorable as if it were impossible to redirect them. In contrast, Firey goes into great detail in developing a policy related to his theoretical statement. However, as Rodwin has indicated, "...his (Firey's) conclusions may be consistent with his principle but they are not in any way derived there from... one may or may not share them but it would be just as easy to come to the opposite conclusions given so amenable a guide."[11]

Both these approaches - one refusing to state policy implications, the other stating conclusions which are unrelated to the theory - indicate that the final criterion for judging the adequacy of a theoretical statement must be that major policy implications are both directly stated and clearly related to the theoretical statement.

If these are the criteria which should be utilized in judging the adequacy of any theoretical statement, that statement must be tested in terms of a particular situation. In this case we are concerned with a series of statements which must be tested in order to determine that one approach or combination of approaches which best describes and explains the distribution of residential space in one metropolitan area. In order to clearly direct the test of the several statements, a controlling hypothesis is required. This hypothesis is that the metropolitan area under consideration is organized in terms of sectors as defined by Hoyt or access zones[11] as defined by Vernon-Hoover. If neither scale holds either Firey's generalization that there is no such overall scale or, if the evidence so indicates, a statement that there is some other scale must be accepted.

The several variables hypothesized by the various approaches will be examined in terms of the sector and the access zone. Concomitantly, these variables will be organized in terms of other scales to determine the impact of these scales. The role of both the variables and the processes hypothesized as bringing about changes through time will also be investigated in terms of their relationship to the various scales.

Appendix B contains a detailed statement concerning the methodology of the test. It develops this methodology in terms of the conceptual framework, the criterion, and the hypothesis stated in this chapter. The criteria for choosing Philadelphia as the metropolitan area to be studied are stated. The scales of analysis selected are the metropolitan area itself, the county, the access zone and the sector. The variables distributed within these scales are studied in terms of the Planning Analysis

Area,[12] the census tract, and the block. Given the limitations on time in the thesis, detailed analysis of the several variables is only made for two sectors and the access zones within them.

These variables are those hypothesized by the several approaches, subdivided into the broad categories of 1) Distribution of population; 2) Access to work; 3) Physical environment; 4) Government action; 5) Socio-economic variables; and 6) miscellaneous variables. To adequately compare and contrast the relationship between these variables an Index of Similarity is constructed for a selected number of variables. This Index shows the relationship between the distribution of the variable at the particular scale of analysis and its distribution in the entire metropolitan area. Thus, it is possible to determine how the distribution of the variable shifts throughout the metropolitan areas, at different scales.

A specific time period is chosen for studying changes through time: 1940-1956. This time period was selected both because of the difficulty of obtaining 1960 data and because, since 1956, the patterns of accessibility to the core have changed with the completion of the Schuykill Expressway in Philadelphia. Concerning one of the sectors studied in detail change through time is analyzed for a period stretching back into the Colonial era. These changes through time are related to both the variables and the process involved in growth as hypothesized by the several approaches.

Appendix C contains the data, organized at the different scales and in terms of the six categories defined above. On the basis of this

data

data, as so organized, discussion will now be directed toward the statement of that one theoretical approach or combination of approaches which best describes and explains the distribution of residential space in one metropolitan area. This discussion will be structured around the criterion and hypothesis developed in this chapter.

DISCLAIMER

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CHAPTER TWO

A.

SCALE

The criteria concerned with scale stated that any theoretical statement about the distribution of residential space in metropolitan areas must: a) organize the data at a scale which is not so gross that it implies a homogeneity where none exists; b) organize the data at a scale which is not so small that it misses any implications of homogeneity; c) determine that scale which most effectively reflects the distribution of residential space - whether it be the sector, the concentric ring, some other pattern, or the lack of pattern posited by Firey; d) approach the data from the scale of the metropolis; and e) determine whether the variables change their relationships at different scales of analysis.

Concerning "a" and "b" the test material contained in Appendix C has indicated that the homogeneity of the data differs according to the variable being studied; that for each variable there is probably one scale which best reflects homogeneity; and that this scale may or may not coincide with scales required to analyze other variables.

The data describing access to work patterns in the Philadelphia Standard Metropolitan Area (see Part II - Appendix C) shows that such patterns play a meaningful part in the distribution of residential space in the metropolitan area as measured by a time-distance radius from the place of employment. This radius - outside of which

few people are willing to commute - sets the framework for the location of residences. As such, it reflects a homogeneity basic to the role of access to work. This radius is not consistent throughout the metropolitan area however. It ranges from twenty minutes median commuting time for those who both live and work in the regional periphery to forty seven minutes for that seven percent of the population which lives in the central city and commutes to the suburbs. The median for all workers - as has been mentioned - is thirty to thirty nine minutes.

Within the framework of this time-distance scale of analysis a whole set of physical and socio-economic variables are distributed. The data has indicated that a major - and as yet unsolved problem - concerns the proper scale used to analyze these several variables. Each of the scales utilized to examine these variables in Appendix C brought out a different cartographic pattern. In analyzing the valuation of housing, values were mapped at both the scale of the census tract and the scale of the block (Charts C-4 and C-19 respectively, Appendix C). The pattern by census tract exhibits a greater regularity than the pattern as defined by blocks.[2] In one of the census tracts contained on Chart C-19, for example, valuations ranged from $8,304.00 to $50,000.00 per block yet median valuation only equaled $14,247.00. Moreover, blocks adjacent to each other had valuations as far apart as $20,000.00.[3] None of these refinements are observable when the census tract is exclusively used.

Even less refinement is obtained when the Planning Analysis Area is utilized to organize data. The Index of Similarity contained in Appendix C-2 indicates a certain pattern as far as selected socio-economic variables are concerned for Sectors III and VI. For a check this Index was also constructed for selected census tracts in Mont-

gomery County Planning Analysis Area 1. This Index for the smaller scale indicated a great discrepancy between the two census tracts which the Index at the larger scale does not show.

Consequently, the problem is one of determining which of these several scales is best for analyzing the variables. This, in turn, depends upon the variable under consideration. Traditionally, for example, residential space in metropolitan areas has been examined at the scale of the neighborhood, implying that the physical and socio-economic variables were correlated by this scale: the physical aspects of the environment - density, housing type, schools, shopping centers - were used to define a discreet residential unit containing some specific population, usually defined numerically and by age and sex characteristics.[4]

It is a serious question for planning whether the physical and socio-economic variables are actually homogenous at the same scale and, if they are, whether that scale is the neighborhood. A series of small - and, as yet, limited - studies[5] undertaken in a few American cities have indicated that, while the neighborhood continues to maintain its social and functional role for the very young and the very old, it no longer performs this role for the in-between age group: they not only tend to shop out of the neighborhood, they also tend to socialize less in it, except at the extremely small scale of the block or street-front.[6] Moreover, material contained in Part III of Appendix C also illustrates the importance of this smaller scale: whites who purchased their homes in racially changing neighborhoods only tended to buy when a Negro family lived in the adjacent block. They did not buy when it lived across the street or next door: it was the immediate scale of residential space which concerned the

prospective purchaser.

Consequently, there seems to be a sharp distinction between the physical variables and the socio-economic variables as far as the scale of " neighboring " is concerned. The homogenous social unit may not be the same as the homogenous physical unit.

It also may not be the same as the homogenous functional unit. The neighborhood approach is built around the function of education. For the elementary age school group the social and the functional unit are similar. For their parents it is harder to discern any functional group which corresponds to the social group - which may be spread throughout the metropolitan area.[7.]

Since physical, socio-economic, and functional homogeneity vary, since the scales used to analyze them vary, since each cat - egory is represented by a great many variables, and since the scales required to adequately express the homogeneity of each variable may not necessarily coincide, the choice of a scale which will effectively describe the distribution of residential space in the metropolitan area is difficult, if not impossible. However, both Homer Hoyt and Vernon-Hoover have attempted this goal.

Criterion " c " concerning scale states that a theoretical statement should determine what particular scale - if any - best reflects the distribution of residential space. The discussion so far has indicated that there are many scales in the metropol - itan area, reflecting many homogeneities. The problem is whether Hoyt's and Vernon-Hoover's scales adequately encompass these other scales.

The evidence contained in Appendix C indicates that at both the scale of the census tract and the ecological neighborhood there has been a high rental sector in the P.S.M.A. moving beyond the municipal boundary but not extending into the periphery of the metropolitan area, at least to the west. This sector has been associated with some of the other variables which Hoyt hypothesized: the radial system of transportation, topography, free open land, the leaders of the community, and real estate promoters. However, as has been indicated, this sector is no longer as homogenous when analyzed at the scale of the block. Subtleties become apparent.

Moreover, Hoyt's class and caste system, which is an assumption basic to his approach, denies the heterogeneity of class and caste in America. Chart C-14 and Chart C-13 B show that class in this country is not rigidly defined in terms of rent and income. There are ethnic distinctions between groups. These groups have their own class lines and their own "leaders of the community." The caste system is certainly not as rigid and unbreakable as Hoyt presupposed. Whites and Negroes are integrating in residential areas throughout the country.[8]

Hoyt's scale is not built to contain such complexities. It cannot define the shifting relationships between physical, socio-economic, and functional definitions of residential space. The subtleties and details are blurred.

Even with such blurring, however, sectors still have their value in analyzing the distribution of residential space. Without

them there would have been little insight into the differential development of the P.S.M.A. For example, describing the P.S.M.A. in terms of sectors shows how the Pennsylvania counties are more heavily populated and more industrialized than the New Jersey counties. Moreover, there are important distinctions between each of the Pennsylvania sectors. The one to the north, extending into the lower half of Bucks County, has the greatest amount of new construction and the greatest percentage of P.S.M.A. population. It also has the highest percentage of manufacturing and non-manufacturing (outside of the central business district) jobs in the reginn. In contrast the sector extending to the west - III - contains fewer people and fewer jobs, particularly manufacturing jobs.

The exclusive use of sectors, however, gives no sense of the concentration of jobs and people at the core. In 1950, according to Table C-VI, 70.3%of all manufacturing jobs and 79.9% of all non-manufacturing jobs lay within a thirty minute time distance of the central business district. And, as Table C-II shows, 74.5% of the population also lived within this time distance (as defined by mass transit).

Thus, the use of access zones as descriptive concepts also gives important insights into the distribution of residential space in the metropolitan area. Unfortunately, however, they are prey to the same criticisms of scale leveld at sectors. This is especially true of the counties which Vernon-Hoover used to organize much of their data. Based upon political, rather than natural boundaries, they do not begin to approximate the rich variety of the many parameters, even when they are again subdivided into a series of rings and inner and outer rings.

Access zones to the central business district are helpful, however, in describing the distribution of residential space. Given the con - centration of jobs in the core and given the median commuting times prevalent in a region, a large percentage of the population is certain to locate near the core. Where such zones lose their importance is at that point beyond which people will not readily commute.

Within this radius, however, the distribution of selected socio-economic variables in Philadelphia resembles that posited by Vernon-Hoover for New York (Appendix A - II). Low-income groups, non-whites as well as wealthy and childless couples are concentrated near the core. Further out in the core are lower middle income groups, inter - spersed with upper class communities which are zoning protected. Such groups continue into Ring I (access zone II as defined in Appendix C), changing slowly into upper income communities, containing large numbers of childreh.

The distribution of the housing supply as hypothesized by Vernon-Hoover (Appendix A - II) does not resemble the pattern in Philadelphia, except in gross terms. There is some similarity in that the core is being developed both through public investment in subsidized housing and with urban renewal as well as by private investment in lux - ury housing. Conversions are also being made to meet the housing needs of the non-white. However, there is no clear ring of " thinning-out " of the population followed by a ring of increasing densities, based upon the process of conversion. Instead,"thinning-out"seems to be occuring throughout the central city with pockets of concentrations in the slum areas. Moreover, conversions are related to this " thinning-out". Even though the number of units increases, the population continues to de-

cline. There is also no ring of new construction devoted to the development of apartments. Instead the units being built[9] are largely in row or single family housing. Moreover, such housing is located in the central city, particularly in PAA K and PAA L to the north.

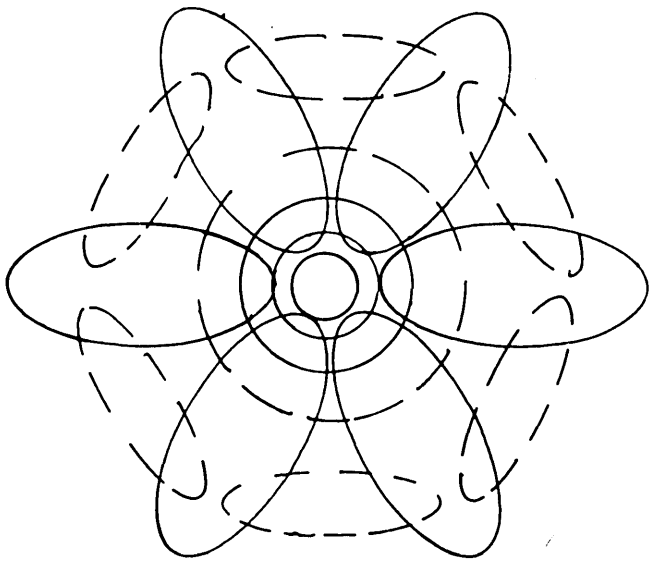
Outside the time-distance[10] radius within which most people are willing to commute the use of access zones to describe the distribution of residential space becomes less meaningful. The metropolitan area is organized in different terms at and near the periphery.

Given the inadequacy of both access zones and sectors to describe the overall distribution of residential space and given the problem of homogeneity developed earlier in this chapter, Firey's criticism that there is no consistent pattern in the metropolitan area would seem to be valid. However, Firey also neglected to adequately consider the problem of scale. He saw the complexity of socio-economic and physical variables at the smaller scale and refused to generalize from this complexity. But he ignored - until forced to its consideration in the later part of his book[11] - the functional aspects of space at the larger scale.

These functional aspects of space set the framework for the distribution of residential space in the metropolitan area. Assuming that work is the major function which households perform, the time-distance they are willing to commute determines the location of the majority of households in the metropolitan area. In the P.S.M.A. this time-distance differs in the core and the periphery. The peripheral areas have greater self-sufficiency than areas closer to and in the core: they tend to export and import less labor and their residents live closer to their work. Those workers who either

leave or enter an area tend to commute from or to an adjacent area or else travel to work within the same sector - either toward or away from the core. Such commutation seldom takes place from a sector situated in one part of the metropolitan area to a sector situated in another part.

Consequently, the scale describing the framework for the dis - tribution of residential space would seem to be a combination of access zones and sectors, based upon the function of work. The diagram below schematically illustrates the pattern defined by using this scale. The concentration of jobs controls the distribution of res - idential space to a maximum commuting point. A series of sectors, organized about the system of transportation, cut across the access zones, moving outward toward the periphery. These sectors are rel - atively self-sufficient, except for movement into the core and move - ment between adjacent sectors. The point of maximum accessibility - in terms of time-distance occurs where sector and access zone to the core cross.



The adequacy of the various theoretical statements in terms of criterion "d" and"e" above has been implicitly stated in the above discussion. As far as approaching data from the scale of the metropolis is concerned, Hoyt's conclusions suffer because they are confined to the municipal boundary. As Appendix C-2 indicates, there is evidence of a sector at the scale of the Planning Analysis Area and the census tract: this sector continues beyond the city boundaries in Montgomery PAA 1. Beyond this point it does not exist. Sectors, as defined in Hoyt's terms, do not extend to the metropolitan periphery.

The reason for the change in the relationships between variables at the several scales has also been indicated. Each variable has its own homogeneity which is best described by one particular scale. Since neither homogeneities nor scales coincide, relationships between the variables is bound to change as different scales of analysis are uti - lized.

B. Variables.

The criterion concerned with variables stated that, to be com - plete, any theoretical statement concerning the distribution of res - idential space should contain all variables important to this dis - tribution. Many variables have been studied by the several analysts but, at no time, has any <u>one</u> attempted to state in a simple and clear fashion what all these variables might be. Though such a listing is obviously outside the scope of this thesis, it is not outside the scope

to indicate the categories which might be utilized to contain the several variables.

Before doing so, however, it is essential to realize that such categories and the variables subsumed under them cannot be defined only in spatial terms. Instead, they must be so articulated that they link both space and time at the several scales of analysis. If the variables are defined only in terms of their distribution in space, the process of change through time is ignored. The analysis becomes
12.
static, descriptive.

In fact, this is a danger inherent to the use of a spatial hy - pothesis which concentrates upon a fixed moment in time. It may give an adequate description of the distribution of a large number of assorted variables but it gives no sense of the interaction between these variables through time. It may even obscure this interaction so that the process of change becomes less important than some fixed pattern.

Analysis of both sections A and C of this chapter indicates that the several variables can be thought of in physical, functional, or socio-economic terms, as defined by both space and time and as existing at the several scales. It is within these categories that the variables must be analyzed if they are to effectively both des - cribe and explain the distribution of residential space in metro - politan areas in space and time.

C. Time

The criterion concerned with time stated that a theoretical approach must determine whether the variables hypothesized by the analyst play the predicted part, some other part, or no part at all; whether there are other variables not discussed; whether the process resembles the one stated by the analyst or some other process exists; and whether the relation between the variables changes through time.

The material contained in Appendix C indicates that the variables hypothesized by Homer Hoyt are only partially related to the distribution of residential space in the metropolitan area. Topography, the system of of transportation, vacant land, and the role of residential promoters - all these have worked in a way which Hoyt would have predicted. However, as has been indicated, his high, intermediate, and low rental sectors do not seem to bear up under the scrutiny of the smaller scale; his class and caste system is much too rigid for twentieth century America; and his notion of " the leaders of society " denies the pluralistic nature of American cultural experience.

Therefore, it cannot be assumed that high-rent sectors control the distribution of residential space in the metropolitan area. Sector III - the " Main Line " is not growing as quickly as Sector I to the north. Sector III, however, contains the " leaders of society " as they have been defined by Hoyt. In contrast, Sector I - to the north - is now the largest and most rapidly growing sector in the metropolitan area. Though it does have its proportion of high value areas and high income areas, it also has a new steel mill and Levittown, both containing far different growth factors than "class. "

In contrast, the variables hypothesized by Veron - Hoover are in -

timately related to change as it has occured in Philadelphia. The patterns of access to work are extremely similar. Rising incomes are laying a foundation for increased expenditures upon consumer goods. These incomes are giving families and households the opportunity to escape the higher densities and overdfowded conditions in the dentral city. Families with children are particularly apt to so leave. Consequently, the process of "thinning out " is occuring throughout the central core and conversions are no longer as important in meeting household needs. Large areas of the central city are experiencing high vacancy rates for the first time in their history.

Some of the slack in demand is being taken up by the Negroes who are migrating to the north from the south. Infact, if it were not for this demand, the central city would be losing population at a much faster rate.

Government action has been unable to stem the trend, though urban renewal in Philadelphia is one of the more vital programs in the country. Of course by 1956 its effectiveness could not be adequately measured, as the program was in its infancy. However, the task it faced then was immense and the 1960 census figures indicate that it has become even larger in four years.

Firey's emphasis upon the role of culture in determining the use of space provides some insight into the nature of this demand for low-density housing. Essentially what appears to be happening

is that a culture of age-groups is developing in the United States.

Space is being distributed in terms of these age groups instead of along class lines. This is essentially a cultural phenomena, referred back to the rising incomes which make it possible.

Consequently, it may well be that the symbolism and sentiment attached to residential space have shifted from upper class areas and ethnic areas to low-density suburbs. Such suburbs may certainly be upper-class and have ethnic derivations; however, the low-density is the primary requirement.

In essence, as best as can be determined by the nature of the housing constructed in the P.S.M.A., this low density development is probably related to a desire for all the elements which go with it: schools, service, shopping, streets, utilities, etc. The demand is for a functional environment - at the several scales of analysis. The dwelling unit itself is expected to function in terms of a re - quired amount of space.[14] The immediate, perceptual scale is a social unit for the homeowner as well as the child and the older adult. The neighborhood is a social unit for the child as well as a functional unit. It may also be the same for the adult. The unit defined by the maximum commute is the functional unit for work. There are also other functional and social units at this same saale of automobile access - some implying leisure, others friendship and communication.

Many variables have to be fitted into these functional, physical, and socio-economic categories in terms of the various scales. Some of them have already been mentioned; others involve such factors as the levels of the service to the physical environment; levels of service to the social environment - schools, institutions, etc.; patterns of

access to shopping, service, and leisure-time activities; the architecture and design of urban and suburban spaces; the design and the space of the individual dwelling unit; the role of " secondary wage earners," in determining residential location; the role of education in defining class; the relation between occupational and residential mobility; the role of mobility itself; the housing market.

This is only a partial list of variables which have, as yet to be related to the process of change. It is important, however, that they be constantly held in mind, even though their exact effect is not yet known.

In relation to the process through which these variables work, again that process seems to be the one hypothesized by Vernon-Hoover, with one possible qualification. That qualification involves the nature of the invasion-succession process. This process is traditionally based upon two homogenous units, one of which "invades " the other and finally suceeds to its territory. This thesis has indicated that the problem of defining a homogenous unit is more complex than this simple statement allows. Moreover, the material in Appendix C-PartIII has indicated the possibility that homogeneity may not even be as clear as formerly assumed in Negro-White neighborhoods.

Otherwise, the process as hypothesized by Vernon-Hoover for New York reflects that in Philadelphia, with minor qualifications concerning the housing supply which, as has been mentioned, is diff - erent, in terms of type, age, condition, tenure, etc. Essentially, however, the demand for low-density and its functional components works through the housing market to create the building of new units which are largely located on vacant land, even in the central city.

This market differs from Hoyt's in that it is conditioned by government activity. However, even in Philadelphia with its strong emphasis on planning and renewal, the trend toward the suburbs had not been stemmed. This residential shift to suburban areas - combined with the movement of jobs to the suburbs - is slowly de-emphasizing the role of the core in the metropolitan area. The peripheral regions contain more people and more jobs. The peripheral regions are beginning to possess their own integrity.

The reasons for such integrity must be seen as lying within a cultural framework. Changes in this framework - for example, the increased importance of the child-centered family - play an important part in the nature of the demand for low-density development. The reasons for such change are beyond the scope of this thesis.

The final criterion concerned with changes through time stated that any theoretical approach should indicate if the variables change their relation through time. Hoyt did not allow for such a shift. His parameters remained constant, reaching far back into history. In contrast, both Vernon-Hoover and Firey recognize that parameters can have different meanings at different moments in history. However, in terms of the material summarized in Appendix C, Vernon-Hoover tend to give too much emphasis to the role of conversions in modern America and Firey tends to neglect the way symbolism and sentiment can shift from urban space to suburban space.

D. Combined Theoretical Statement.

Both the distribution of residential space in metropolitan areas as well as its growth pattern are best described in terms of a common set of physical, functional, and socio-economic variables. Each of these variables are homogenous at some particular scale. These scales may or may not coincide. The fundamental scale for describing the growth pattern and explaining the redistribution is determined by the journey to work. It is the radius within which people locate their residences. As it changes the distribution of residential space also changes, provided that incomes are available to allow such changes to occur.

Within the framework of access and incomes a large number of functional, physical, and socio-economic variables interact to bring about change in space. Among the more important of these are age structure of the family, racial characteristics, ethnic con - siderations, the role of government, topography, amounts of vacant land, class structure, and liesure. All these variables interact within a culturally defined framework.

CHAPTER THREE

IMPLICATIONS FOR PLANNING POLICY

The material analyzed in this thesis has indicated that the metropolitan area is reorganizing itself in terms of a combined access zone and sector pattern based upon the function of accessibility to work. Current planning activity is devoted to a greater extent to the area contained in the access zones about the central business district. Funds and technical services are allocated to reviving the central city; the choice implicitly posed is " either-or. "

Actually, there is no such dichotomy and whenever renewal creates it - either explicitly or implictly - it is doing the entire metropolitan area a disservice; the central city is being depop - ulated because of a demand for low density which the city can no longer offer - unless it happens to have some vacant land as Phil - adelphia does. In order to survive the central city must recog - nize this demand for low density as an inescapable fact to which it must adjust.

If it cannot afford to offer these low densities to families with children then it is certain to loose them. Such depopulation should not be considered as a bad thing. It may not do the tax base good but it is certainly an advantage to those who were formerly forced to live at inhuman densities due to low incomes.

The central city has to adjust to a change in function as far as residential uses, at least, are concerned. If urban renewal is utilized to attempt to change this function without recognizing the

inexorable trend toward low densities, then the housing built under renewal at higher densities may simply go unrented - except for units occupied by childless couples, certain low income and non-white groups.

The problem is to restructure the central city in such a way that it fits its change in function while, conomitantly, giving the relatively self-sufficient sectors an articulation they lack at present except in terms of the scale of access to work. It is such articulation which areas at and near the periphery need most greatly. In fact, given the demand for low densities, given the amount of vacant land available in such areas, it may well be that planning activity at the fringe is even more important than activity in the core, if either must have greater resources allocated to them. The fringe areas are still open: it is possible to give them a form, a shape, and a texture.

To do this, however, within the metropolitan framework demands a knowledge of the relationship between scales which the profession has yet to fully develop. For example, it may well be that the two most important scales for planning are - in an automobile age - the block and the access zone, defined in terms of time - distance to work, shopping, and leisure.

By thinking in terms of this smallest scale, the planner is required to visualize specific building types as far as bulk is concerned, to even consider the massing of plantings and the texture of pavement. If this same block scale is also the smallest homogenous social unit, it may be possible to develop a greater degree of heterogeneity within some functional unit - such as the school. If the

residences are all of the same quality design, it is conceivable that public housing at a very small scale could be mixed with middle-income housing. This mixing at the smallest scale could also be utilized to create non-segregated residential areas.

Design at the scale of the access zone is even more challenging. The planner does not yet fully understand all the implications of accessibility and perception in terms of movement. Yet this is the functional scale around which residential space is being organized and it requires an articulation.

Material contained in the Appendix - particularly the summatiom of the Vernon-Hoover theory - also indicated that a major policy problem for both the core and the periphery is the rapidity with which neigh - borhoods and residential areas change today. Zoning has helped to stabilize this situation to some extent but the ordinance is only a legal tool which can be changed. As yet, there is no real mechanism for maintaining stability where it is desired.

It might be that we are forced to choose stability as a goal because of the nature of the structure and the investment in it. If more urban structures were designed for convertability, change might be a much less disruptive force in the urban environment.

Finally, the material contained in this thesis has indicated, more than anything else, that the planner's major analytical problem concerns his relation to trends. As has been stated the trend in the demand for low density has been accepted in the thesis. However, this trend is but the product of men's minds and hearts: it can be changed and no planner should ever forget the possibility.

CHAPTER FOUR

Summary. Directions for Research

In order to analyze the nature of residential growth in metro - politan areas, a conceptual framework based upon the scale of anal - ysis, the distribution of variables within this scale of analysis, and the process of change as defined by time was developed. Criterion were stated within this conceptual framework for judging the adequacy of three theoretical statements concerning the nature of residential growth. Upon the basis of their adequacy, a combined statement was developed which both describes and explains the distribution and growth pattern of residential space in the Philadelphia Standard Metropolitan Area.

This statement indicates the roles of the several scales of analysis in describing and explaining the relationships between the many variables: access to work sets the scale within which the several physical and socio-economic variables are distributed. These variables may or may not be homogenous at the same scales.

The process by which residential space is being distributed in the metropolitan area consists of invasion-succesion working through the housing market, as modified by government action. The major variables are contained in physical, functional, and socio-economic categories. All variables are structured by a specific cultural context.

One of the first - and most rewarding - tasks for research would be to simply attempt to contrast and compare all studies concerned with

residential space in terms of the conceptual framework developed in this thesis. Such collation would give a definition of all the variables which have been investigated, their relation at the various scales, and their relation to the process of change.

By utilizing this information, a tentative model could be constructed. Hypotheses could be deduced from this model. Such hypotheses would be concerned with subjects such as: the homogeneity of the variables at different scales; whether both homogeneity and scale change through time or whether only one changes; what categories variables might best be organized under; the relation of the homogeneity of the variable to the invasion-succession process; the relation between scale, variable, and process.

These hypotheses would be tested in a metropolitan area and the model then reconstructed and the hypotheses refined. By continually repeating this process, a theory of residential growth in metropolitan areas can finally be established.

Appendix A.

A Summary of Selected Theories

I. Homer Hoyt.

A. Scale of Analysis.

Hoyt's scale of analysis is that of the city as defined by municipal boundaries and the sector as defined by the system of transportation, rents, class and caste.

B. The distribution of a particular set of variables within this scale of analysis.

Using data from the real property surveys made in 1934, Hoyt selected eight items for analysis: the average rental of the block, the percentage of the total number of residential structures in the block that are owner occupied, the percentage of the total number of residential structures in the block that need major repairs or are unfit for occupancy, the percentage of the total number of structures in the block that are used for residential purposes, the percentage of the total number of dwelling units that have no private bath, the percentage of the total number of persons living in the block that are of a race other than white. He hypothesized that average block rent is representative of this series of housing factors. (1.)

By using this measure he determined that there was "a general pattern of rental areas that applies to all cities." (2,) In this pattern high rental areas form sectors along radial lines

from the center to the periphery or take the form of a, "rectangular or circular area on the periphery of one sector." (3.) Intermediate rental areas tend to surround the high rental areas or lie on the periphery of other sectors of the city. Low rental areas move from the center to the periphery in other sectors. All these sectors tend to grow outward in the same direction, low and high rental areas being mutually exclusive. (4.)

Rent, as he uses it, is not only correlated with the eight housing factors defined above but, also, with the economic condition of the renter, both measurable and immeasurable factors, as well as reflecting (for upper and middle levels) differences in topography, style of architecture, accessibility to schools and shopping centers, proximity to adverse influences, and restrictive covenenants.

It formerly reflected the concentration of ethnic groups in low rental areas but ... "the German, Russian, Polish (and other ethnic) areas will undoubtedly tend to become more and more diffused within the common mass of the urban organism." However, low rent continues to indicate the qualitative differences of housing between white and non-white races. It is the "economic circumstances of the non-white groups (which) compel them to dwell, for the most part, in sections marked by low-quality housing." (5.)

C. Time.

Hoyt is concerned with the growth of residential neighborhoods at several levels. The first of these is the nature of population growth in the city. It is "dependent upon the advantages which make the given urban site a favorable spot for industry and trade or for recreation."(6.) The physical growth of the city itself, however, is not directly correlated with the rate of population growth. It is "measured by the addition of new buildings." (7.) This addition is dependent upon the cyclical fluctuation of the economy and the building industry. (8.)

The second level concerns the physical form which this growth takes. This form can change by expanding vertically, by filling in the interstices of the existing settled area, by growth centralization by lateral extension, consisting of axial growth, growth of isolated nuclei of houses, and coalescence of these nuclei. Such patterns of growth are not mutually exclusive. Each type is intimately related to the system of transportation prevailing in the particular city. He predicts that, with the automobile, "radial rather than central growth will probably be accentuated and congestion will probably decrease in urban centers. Complete decentralization of cities, however, is extremely doubtful in any organized society."(9.)

The third level emphasizes the changing pattern of land uses in the city, with particular attention to commercial and industrial uses..." in growing cities, the expansion of business and financial uses in the central portion presses outward and impinges on

other land uses. They, in turn, thrust outward and impinge upon the next encircling belt of uses. The retail shopping center tends to be pulled in the direction of the growth of the best residential areas. Lateral growth of financial, business, and retail uses of land has declined because of vertical growth made possible by new inventions. Wholesale areas have also declined in importance and also leaned toward vertical growth. Manufacturing zones have tended to locate in specialized districts rather than near central business districts." (10)

These levels of growth set the framework for an understanding of the growth pattern of residential neighborhoods. This growth pattern, stated as a series of hypotheses, occurs as follows:

1. High rent neighborhoods of a city do not skip about at random in the process of movement. They follow a definite path in one or more sectors of the city.
2. The movement of a high rent area is, in a certain sense, the more important because it tends to pull the growth of the entire city in the same direction.
3. High rent areas proceed from a given point of origin along established lines of travel or toward another existing nucleus of building or trading centers.
4. High rent areas progress toward high ground which is free from the risk of flood and along lake, bay, river, and ocean fronts when such waterfronts are not used by industry.

5. High rent areas grow toward the section of the city which has free open land beyond the edges and away from dead-end sections which are limited by natural or artificial barriers of expansion.

6. High rent areas grow toward the homes of the leaders of the community.

7. Office buildings, banks, stores pull the higher priced residential neighborhoods in the same direction,

8. High grade rental areas tend to develop along the fastest existing lines of transportation.

9. The growth of high rent neighborhoods continues in the same direction for a long period of time.

10. Deluxe apartment areas tend to be established near the business center in old residential areas.

11. Real estate promoters may bend the direction of high grade residential growth. (11.)

Implicit to these hypotheses is a definition and acceptance of both a class and a caste system in the United States. The groups possessing intermediate incomes desire to live close to the, "leaders of the community," and press outwards around these upper income groups. Color differences are inexorable and unbreakable.

There is also an implicit acceptance of the "filtering down" process as the primary factor involved in the shifting of the residential neighborhoods. "As these (higher rental) areas grow outward, the lower and intermediate rental groups filter into the homes given up by the higher income groups."(12.) Basic to this acceptance of filtering is the assumption that, with age, neighborhoods must depreciate and must become less desirable, though the most stable neighborhoods are the intermediate rental areas. Regardless, "every building boom, with its new crop of structures equipped with the latest modern devices, pushes all existing structures a notch down in the scale of desirability."(13.)

D. Implications for planning policy.

Hoyt is not directly concerned with drawing policy conclusions from his analysis. However, the implications exist, and, as such, they must be directly stated. His emphasis upon the "pull," of high rental areas indicates their importance for policy considerations. In fact, these areas become strategic in such decisions as their location is the determining factor in the direction of growth of the city. Provision of homes for this rental group would appear to be the best means of providing homes for the other groups. As the higher rental units filter down to the intermediate and lower income groups, their housing needs are met. Resources would therefore best be allocated to the construction of high priced homes on the assumption that the filtering process will meet the housing needs of the general populace.

Blight and obsolescence seem inevitable. In fact, the growth of the city is in the grip of inexorable forces which control its pattern of development. As high rental units shift outwards, down grading is certain to occur. There is little to be done to prevent this process.

There is also little action which can be taken to change the existing structure of white-negro relations. American society is in the grip of a caste system which has influenced the pattern of residential neighborhoods since the Civil War and will continue to do so.

This acceptance of certain trends is common to Hoyt's approach on many levels of analysis. He reaches far back in to the past to arrive at his conclusions concerning the "pull" of high-rental neighborhoods. Having reached this conclusion, he extrapolates it into the future without considering other factors which might reorganize the trends. Trends become inexorable and there is little that policy can do to reorient them.

Chart 3
The Three Main Zones of the Region

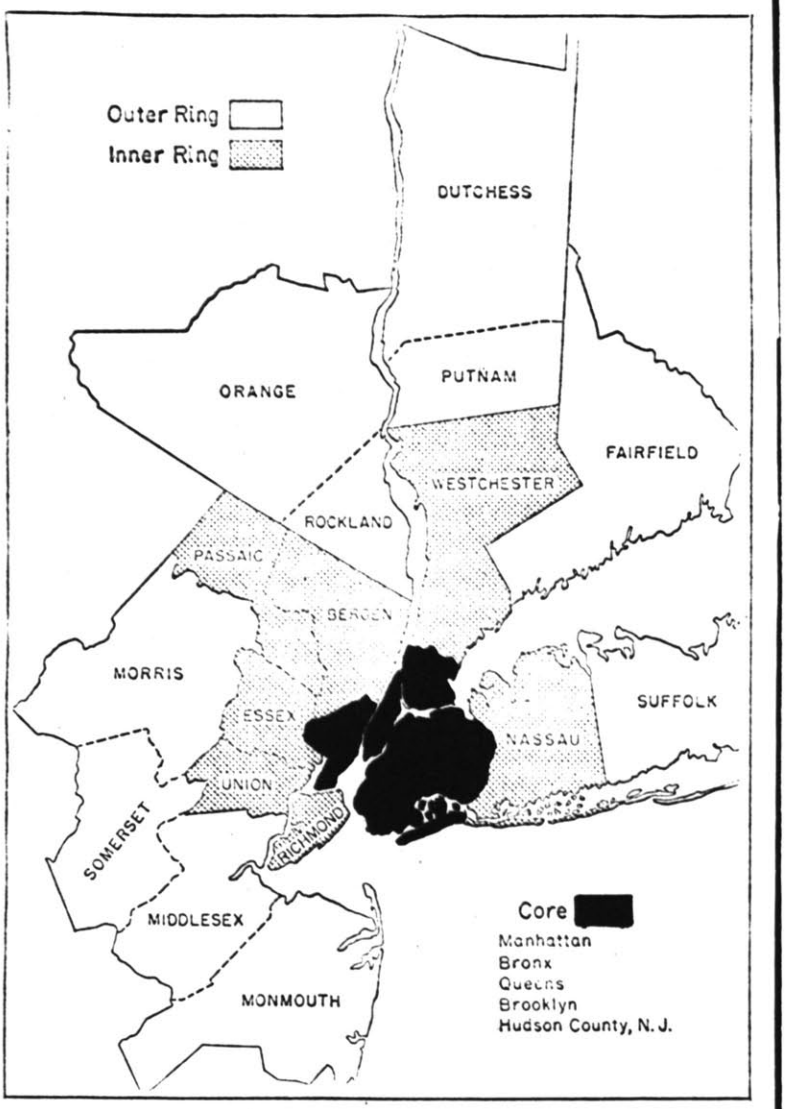


CHART A-I

SOURCE: ANATOMY OF
A METROPOLI

II. Edgar Hoover and Raymond Vernon.

A. Scale.

The scale of the analysis is the metropolitan area of New York City as defined by county boundaries. This area is indicated in Chart A-I. Within this broad scale, the finer scale of concentric rings and access zones are utilized.

B. Distribution of variables within this scale of analysis.

Not only do the variables emphasized by this approach vary considerably from those stressed by Hoyt but the pattern by which they are distributed is also markedly different. This distribution is seen in terms of both a series of concentric rings and access zones organized about the central core. The rings are those defined in Chart I and the access zones are defined in terms of 15 minutes time-distance zones to Manhattan. The variables are distributed in a specific manner within these rings and access zones. This distribution occurs as follows.

1. Concentric Rings.

There is a definite pattern of distribution of population and housing types within the core and the rings:

	Population	Housing
Core, inner.	Low-incomes, non-white, laborers, operatives, and service workers. Also, wealthy who are largely childless.	Area of multi-family dwellings in high-rise apartments. New construction occurs through public intervention in terms of urban renewal or subsidized housing, as

	Population	Housing
Core, inner (cont'd.)		well as luxury apartments by private investment. Also area of conversions, particularly to meet the housing needs of non-whites.
Core, outer.	Lower middle income and white-collar and/or semi-skilled workers.	Thinning-out. Deconversions occuring, mergers occuring.
Core, outer and Ring I, inner.	Lower middle, income and white collar and/or semi-skilled workers.	Area of new construction occuring through apartment developments.
Ring I, inner and middle.	More skilled workers, higher status white collar workers. More children. Interspersed with upper class-communities which are zoning protected.	Area of new construction occuring through apartment developments.
Ring I, outer; Ring II, inner.	Upper-income people with children who can afford new housing.	Area of active construction of single family homes.
Ring II, remainder	Exurbanites as well as those who work in these suburbs: also all types.	New construction - single family homes. (14.)

This concentric ring description is an abstraction from reality but it is used as a conceptual tool to describe the general pattern of distribution of people and housing in the metropolitan area of New York. It is also modified

It is also modified in that there is, "not just one high density center but many, of different orders of magnitude... the widening ripples come, then, not from a single pebble dropped into the puddle but from a scattered handful of large, middling, and small pebbles, each a focus of expansion... the pattern does not shape up into neat concentric circular zones because of manifold variation in transport facilities, topography, zoning, and so on, which distort the picture." (15.)

2. Access zones.

Access zones at fifteen minute intervals to Manhattan are also utilized to describe the distribution of variables in the metropolitan area. Concern is for the same variables though other variables are developed. A summation of these variables is contained in TablesA-Ithrough A-IV.

Table A-I:Residential Land Development in Land-Use Survey Area,in Relation to Travel Time to Manhattan, 1954 - 1955

Municipalities classified by access zones (zone 1 is closest to Manhattan)	Number of municipalities in zone	Total acres of residential land available	Acres developed	Acres vacant but suitable for development	Percentage of available residential land developed
1.....	11	14,390	11,368	3,022	79.0
2.....	66	70,021	51,626	18,395	73.7
3.....	73	136,942	91,431	45,511	66.8
4.....	52	140,047	50,403	89,644	36.0
5.....	28	51,734	8,126	43,608	15.7

Source: Anatomy of a Metropolis, pp. 130

Table A-II: Net Residential Density of Municipalities in Land-Use Survey Area, in Relation to Travel Time to Manhattan, 1954 - 1955

Municipalities classified by access zones (zone 1 is closest to Manhattan).	Dwelling units per acre of residentially developed land.
1	25.7
2	7.1
3	5.4
4	3.7
5	3.2
All municipalities in Land-Use Survey Area	6.4

Source: Anatomy of A Metropolis, pp. 137.

Table A-III: Access and Density Characteristics of Urban Places in the Land-Use Survey Area in Relation to Type of Occupational Specialization of Residents

Occupational specialty	Access-zone rating (unweighted average)	Net density (dwelling units per acres of developed residential land)
Professional	3.27	5.50
Managerial	3.09	4.10
Clerical	2.50	5.31
Sales	3.08	6.50
Craftsmen-foreman	2.80	6.77
Operatives	2.50	11.59
Laborers	2.51	21.37
Service	2.43	6.28

Source: Anatomy of a Metropolis, pp. 162.

Table A-IV: Types of Housing in New York Metropolitan Region, 1950

	All types of structures	Single-family structures[a]	Two-family structures[b]	Multi-family structures[c]
Region	100	32.2	15.0	52.8
Core	100	14.6	13.1	72.2
Manhattan	100	1.8	0.8	97.4
Rest of Core	100	18.9	17.2	63.9
Inner Ring	100	51.7	19.2	29.0
Outer Ring	100	69.8	15.2	14.7

Note: Rows do not total 100 in every case, partly because trailers are included in totals but not under any structure type.

a Includes semidetached two-unit structures as well as all one-family structures.

b Two-unit structures other than semidetached.

c Structures with three or more dwelling units.

Source: Anatomy of a Metropolis, Vernon Hoover.

C. Time.

This study posits several variables as being of particular importance in bringing about this pattern of the distribution of variables. These variables are:

1. Access to work.

This is a major factor involved in the shifting patterns of residential space in the New York metropolitan region. Jobs in manufacturing, wholesaling, and retailing are expected to continue their movement to the suburbs. Office and business type jobs will tend to remain more centralized. (16.)

Access to these jobs is of major importance to the worker. His commutation time is less than twenty four minutes for

25% of the population, less than forty two minutes for 50% of the population, less than sixty three minutes for 75% of the population, and over 63 minutes for 100% of the population. (17.)

This time-distance radius frees the worker from being required to locate directly adjacent to his place of work. This freedom sets up the commutation pattern which is illustrated in Table A-V.

Table A-V: Distribution of Workers in New York Metropolitan Region by Zones of Residence and Zones of Employment,[a] 1956

	Total working in Region	Working in Core	Working in Inner Ring	Working in Outer Ring
Total working & living in Region	100.0%	65.5%	23.1%	11.4%
Living in Core	54.6	51.4	2.9	0.3
Living in Inner Ring	32.2	12.3	18.7	1.2
Living in Outer Ring	13.2	1.8	1.5	9.9

[a] This tabulation covers only those who both live and work within the Region. The survey furnishing these estimates found an additional one per cent or so working in the Region but living outside. It may be conjectured that the number living in the Region and working outside is similarly small.

Source: Unpublished tabulations of 1956 journey-to-work survey made.

In this pattern "the core receives the greatest inflow while Ring I and Ring II show a net outflow. Each of these zones also participates in a two-way interchange of commuters with

each of the other zones. Reverse commuting (from core to Rings I and II and from Ring I to Ring II) only accounts for 4 to 5% of the total journeys while 80% work in the zone in which they live and the remaining 15% commute to a more central zone. Only about 2% of the total travel between Ring II and the Core... (these) jobs at the center draw their workers from longer distances, measured in commuting time, than jobs which are less centralized... far and away the largest stream of commuter traffic in the region is Manhattan bound (and) ... roughly equal to this stream is the aggregate of intracounty commuting trips ... together these two categories account for about four-fifths of all commuting journeys... (for intracounty commuting not bound for Manhattan the longest time distance) is in the highly urbanized core counties (while) time diminishes in the less urbanized parts of the region... commutation to Manhattan is progressively more time-consuming the father out one lives..." (18.)

Further evidence concerning work and the place of residence is summarized in Table A-VI where job specialization indexes and residential specialization indexes have been developed for Core and Rings I and II. It is this distinction between specialization of jobs and residences as indicated in Table A-VI which have lead Vernon and Hoover to hypothesize other variables besides access to work as influencing the distribution of residential space in metropolitan areas.

Table XLVI: Specialization of Jobs and Residents in Major Zones of New York Metropolitan Region, 1950

Occupation category	Manhattan	Core outside Manhattan	Inner Ring	Outer Ring
Professional, technical & kindred workers				
Job specialization index	98	100	105	101
Residence specialization index	128	82	113	106
Managers, officials, & proprietors, except farm	1			
Job specialization index	106	96	993	94
Residence specialization index	93	93	122	84
Clerical & kindred workers				
Job specialization index	114	90	88	85
Residence specialization index	95	115	90	72
Sales Workers				
Job specialization index	106	96	95	93
Residence specialization index	93	104	102	88
Craftsmen, foremen, & kindred workers				
Job specialization index	86	108	114	115
Residence specialization index	57	102	107	127
Operatives & kindred workers				
Job specialization index	87	110	110	114
Residence specialization index	94	104	92	109
Laborers, except farm & mine				
Job specialization index	88	101	121	108
Residence specialization index	92	94	99	133
Service workers				
Job specialization index	116	91	82	85
Residence specialization index	190	84	81	93

Source: Anatomy of a Metropolis, pp. 156

2. Income.

Income is a restraint upon the location of residence for the lower income groups, With the rise in per capita incomes, however, the lower income groups are no longer required to locate as closely to their jobs. They are free to leave the slums and quicken the thinning out process occuring in the outer portion of the Core, reducing peak densities of the slums.

Upper income groups, in contrast, are freed from the restraint of income and have tended to either aggregate in Manhattan, in those older zoning protected communities (White Plains, Scarsdale, etc.) in Ring I, or shift far out into the suburbs (at the cost of a long commute).

Much less stress is placed in the discussion upon the distribution of the middle income groups. As with the lower income groups, however, the middle income group is using its increased income to shift into new housing, located in lower density areas, following the outward shift of jobs.(19.)

3. Age structure of the population.

Families with children are tending to shift outward from the central city as illustrated in Table A-VII. "What one does not find in any of the figures presented is any suggestion of a reversal in the long-standing flight of the growing family from the older areas of the Region to the more sparsely

settled suburbs."(20.) This shift reflects a desire for lower densities, as well as a demand for neighborhoods and schools which are conducive to the raising of children.

Table A-VII: Percentage of Population in Age Groups Below 15 years, New York Metropolitan Region, 1950

	Total below 15	Age Group 0 - 4	5 - 9	10-14
Region	21.95	8.96	7.21	5.78
Manhattan	16.70	7.09	5.10	4.51
Core outside Manhattan	22.13	8.86	7.31	5.96
Inner Ring	23.69	9.82	7.88	5.99
Outer Ring	23.37	9.51	7.78	06.08

Source: Anatomy of a Metropolis, pp. 177

4. Changing patterns of Access.

Rising incomes have allowed a wider use of the private car and a less intense utilization of mass transit. "The pattern of new residential development in the region (outside of luxury apartments in and very near the center) will be based upon the assumption of much more automobile ownership than in the past." (21.)

5. Racial characteristics.

Little change is envisioned for the low-income Negro. It is expected that he will remain in his squeezed position which may be made even worse by current relocation and renewal practices.

> The middle income Negro, however, will shift outward to some degree, following the changing pattern of jobs. "Inevitably some part of the colored population will have to find a place in the suburbs. The only question is whether the move will come peacefully or be accompanied by ugly conflicts... there are grounds for optimism on this account... there is no reason to suppose that Negroes will be thoroughly dispersed through the Region... rather it is to be expected that common interests will lead to the development of Negro communities which are as coherent as those of Irish, Jews, or Italians and which offer a variety of types of accomodation without the stigma of inferiority." (22.)

Access to work, income, age, changing patterns of access, and racial restraints - these, then, are the major variables bringing about the redistribution of residential space in metropolitan area. Besides these major variables, others are also developed which, though possessing importance, do not possess the impact have of those just discussed.

1. Topography.

   A factor that limits development - e.g., the salt water swamps in the New Jersey flats across the Hudson.

2. Action of government.

   Though an important variable, it does not possess the major impact of those listed above. Zoning has played its part in the existing pattern, particularly in reference to preserving

the stability of some communities in the Ring I. Urban renewal and subsidized public housing also have their role but it is not as strong as that of the major variables. It is not expected to counteract their force.

3. The Housing Supply.

This variable is placed in the category of the "lesser important" because "in the near future, say the next decade or so, it is likely that only relatively minor effects on population distribution in the Region will come from changes in the conditions governing the supply of housing."(23.) These minor effects consist of more new lower and middle income housing in slum-rental areas on a subsidized basis and more luxury apartments in selected central areas. Other changes will consist of an extrapolation of present trends: single family houses in the suburbs and down-grading in the Core and Ring I..." in the next twenty years the part of the housing which will begin entering the obsolescence stage will be drawn largely from units built between 1910 and 1930... the sheer size of this pool suggests that the impending increase in obsolescent housing may be very rapid."(24.)

4. Ethnic considerations.

It is expected that the ethnic factor will no longer be of great importance in the restriction of populations to particular areas. Such populations will continue to aggregate but because of their desire to live together, not because they

are forced to by societies' attitude. Such ethnic aggregations will shift to the suburbs and, in some cases, "ethnic preferences enter prominently into the choice of a residence, often outweighing such other considerations as access to employment."(25.)

5. Leisure.

The use of leisure, based upon income, is mentioned briefly but not discussed in detail.

In summary, "the most general and apparent trend of recent years is wider diffusion of residence over the New York Metropolitan Region, with a thinning-out of density where it was highest, a slower drop-off of density with increasing distance from the Region's main centers, and a more spacious and more scattered pattern of new development on the fringe.

"We have found several explanations for this shift. One is the recently accelerated trend toward wider suburban dispersal of many important types of the Region's jobs. More important, however, is the increased freedom that virtually all classes in the Region's population have attained in their choice of living conditions, which has lead many to desert older and more crowded areas in favor of newer and more spacious ones. The increased freedom of residence choice that has been attained and the still further freedom that certainly lies ahead, can in turn be traced to rising standards of income and leisure, the mass ownership of automobiles, and the relaxation of some

of the special barriers affecting the residence choice of racial and other minority groups."

The effect of all these factors has expressed itself essentially in a quickening of the characteristic progression of stages in neighborhood evolution, at all major points in the sequence.(26.)

This is a dynamic theory of growth which relates the shift in the pattern of the distribution of residential space in metropolitan areas to many different variables which possess different impacts and which interact with each other. Implicit to this theory, as with Hoyt, is the acceptance of the ecological process of invasion-succession, based upon the relative homogeneity of social groups as defined by the socio-economic indices of occupation and income. The filtering process is also accepted as the major means of supplying people with homes.

D. Implications for planning.

No conclusions are drawn in the study concerning planning policy. In fact, the effects of planning seem negligible when compared to the force of the extrapolated trends. Once again, as with Hoyt, the metropolitan area is in the grip of inexorable forces about which there seems little to be done.

The central core will remain a vital area containing office, business service, and retail uses. But, surrounding it will be a vast pattern of obsolescence, containing fewer and fewer people

every year. Blight will increase at a startling rate as movement to the suburbs increases. This movement will not be clearly articulated as people are freed from the necessity to locate near their work. More inter zonal movements will occur. There will be little overall structure to the pattern of distribution of residential space. Rather, it can be conceived of as a blur, constantly expanding at the edges.

And, if the rate of neighborhood change occurs at even a faster rate than that today, then blight will inevitably creep into the suburbs, especially in those areas where housing is constructed at the lowest cost.

III. Walter Firey.

A. Scale of Analysis.

Firey's scale is both the metropolitan area and the ecological neighborhood. No over all pattern is discerned in the metropolis, however, and the scale determined as the only one useful for analysis is the neighborhood.

B. Distribution of variables within this scale.

Firey analyzes the distribution of residential space at the metropolitan scale in terms of many indices. The first of (27) these is the class structure, with particular attention to the distribution of the upper classes in the Boston Metropolitan Area through history. In tracing their development no concentric ring pattern is discerned. Instead the distribution of residential space possesses a great variability which cannot be mapped in any clear pattern.

To confirm his hypothesis that no xuch pattern exists, he analyzes the distribûtion of this space at one moment in time. Using indices based upon the Social Register, he determines that there is no concentric pattern in the distribution of these upper class families though there is an outward shift to the suburbs. However, the locational pattern of these families, "would seem to be more than enough proof in favor of the sector theory."(28) But as he points out, the sector in which they are located is not uniformly upper class. Between Beacon Hill and Back Bay, for example, lie "a heteogenous area of working class homes and industrial plants."(29.) Maps ulutilizing median monthly rents also fail to clearly illustrate such a pattern. Analysis of the distribution of the homes of workers also do not show any clear sector of "lower class" residential areas. Further evidence of this lack of overall pattern is contained in a map of the distribution of industries employing over 250 workers. Consequently, "though vague concentric and sector patterns are apparent in certain types of land use, the more important fact is the variation of land use within these zones."(30)

To explain this variation, he turns to an analysis at the smaller scale and examines several areas in Central Boston in some detail: Beacon Hill; The North End; The Retail Center; Back Bay; and the South End. Rather than attempt to summarize

all the variables he analyzes, attention in this thesis will only be concentrated upon those related to Beacon Hill, Back Bay, and the North End. These areas have been selected from the several available because they are comparable to those analyzed in the other approaches, involving class and ethnic variables.

The variables examined in these areas largely resemble those of Hoyt and Vernon-Hoover;

1. Socio-economic and cultural component.

   Major emphasis is given to this factor. Detailed statements are made concerning the value systems of the particular class structure which inhabits the area. It is this value system - as indicated by the process below - which endows space with a particular symbolical meaning. This meaning, in turn, controls the distribution of residential space in the metropolitan area.

   Rates of emigration and demographic characteristics are also discussed.

2. Housing supply.

   Type, age, condition, architecture of housing; role of conversions; role of apartments - in Back Bay; rents; valuations; amount of overcrowding.

3. Environment.

   The total environment of the area is considered as having been endowed with a particular meaning in terms of the value system. Its functional importance is not discussed.

4. Land.

   Land use, topography.

5. Systems of Movement.

   The role of accessibility is not analyzed in relation to these three areas.

6. Government action.

   Zoning, tax rate.

7. Miscellaneous.

   Role of residential promoters and restrictive covenants.

Each of these variables has a particular pattern of distribution but that pattern can only be understood in reference to the area in which it exists. The meaning of this pattern is a function of the social system and its values.

C. Time.

Change through time occurs by a definite process according to Firey. This process can only be understood by reference to the social system of the particular society. This system - and the sub-systems or classes within it - are based upon a particular set of values. As a result of this system, space is given

a particular definition and this definition endows space with a particular quality. "Thus both the character of space and the make-up of social systems are of cultural origin. From this it would seem to follow that the cultural component is central to locational processes."(31) This cultural component varies from society to society. In the west it has emphasized the role of space as a productive agent, the role of contractualism in the use of this space, the role of accessibility. However, there are various diseconomic uses - e.g., Boston Common - which cannot be explained by such rational processes. These uses illustrate the force of culturally determined values giving a symbolic meaning to space.

In particular, in Beacon Hill, this symbolic meaning has operated by retentive, recuperative, and resistive influences. (32.) That is, Beacon Hill was able to retain its upper class position, even in competition with Back Bay, because of the meaning values had given to its space; it was able to recover from this competition; and, finally, it has been able to resist down-grading by using neighborhood organizations and government action.

In contrast, down-grading has occured in Back Bay because, "...(it) lacks those sentimental connotations which are such indispensable elements of fetishism. Its symbolic significance has always been in terms of splendor, sumptousness, and aristocratic magnificence. Such connotations do not arouse the same

affective attachment as do ancient historical associations."(33.) Since it possesses some upper-class connotations, however, it has been an ideal area for the location of rooming houses, middle class apartments, doctor's offices, and specialty shops. These uses are attracted to the area because of the "halo" attached to the space by the values it once possessed.

Space can also be given such meaning in what are usually regarded as slum areas. The attraction of the Italian ethnic group to the North End cannot be understood in terms of low rents related to low incomes. Rather this locational pattern exists because of the value system of the group. Possessing consensus it "objectifies its values in instrumental symbols, of which space is frequently an appropriate one.. a spatial area becomes an instrumentality when a social system defines location within that area as a gesture or expression of integration with the values which the members share."(34.) However, such instrumentality is becoming less meaningful as the second-generation migrates out, though there is some evidence that such migration is occuring as a group.

Consequently, the distribution of variables in residential space and the change in this pattern of distribution, can only be understood in terms of the cultural system of the society in question. The symbolical meaning of space determines its economic or functional meaning.

D. Implications for Policy.

In contrast to Hoyt and Vernon, Firey develops a great many policy statements, involving tax adjustments, changes in assessments, slum clearance, urban redevelopment, and metropolitan planning. These statements are made in relation to a theory of the "proportionalization of ends," developed in the last chapter. According to this theory a point can be reached in relation to the many ends striving to use land in the metropolitan area wherein the amount of land devoted to each use will be such that all uses will be in balance. The importance of these ends is determined by the cultural system and there are certain premptive ends - retailing, etc. - and certain residual ends - residential, etc. Moreover, a social system, "does function best when it has sufficient territory at its disposal so that all its spatially contingent functions find spatial articulation."(35.) Finally, at that point wherein the land devoted to each use is such that all are in balance, the good to the society is equal to the good to the individual.

The problem of this theory is determinig that point in practice. Though it may indicate a rational framework for allocating uses, it cannot serve as a guide for the detailed, cartographic distribution of those uses as it is too general. Interestingly enough, to articulate it, Firey was also required, for the first time, to utilize the functional aspects of space in order to determine how they are to be used in a metropolitan area.

Appendix B

Methodology of the Test

The statement of this methodology is made in terms of the conceptual framework, the criterion for testing the adequacy of the test, and the hypothesis developed in Chapter One.

1. The scale of analysis.

   a. One of the criterion developed in Chapter One stated that a theoretical approach only possesses meaning in terms of the metropolitan scale. The problem for the test is which of the 162 metropolitan areas as defined by the 1950 census should be chosen. It must meet the following criteria:

      (1.) It should be one for which detailed data is available from the Hoyt study.

      (2) It should be one which is comparable to the New York Metropolitan Region - so that an adequate comparison can be made. This implies that it contain a strongly articulated regional center.

      (3.) It should be one with enough of a history so that a comparison can be made between it and the urban areas studied by both Hoyt and Firey.

      (4.) It should be one for which data is easily available, given the limited nature of the master's thesis.

   Hoyt's study contains reference to twenty-three cities as far as detailed data are concerned. These are:

Atlanta	New York
Charleston	Peoria
Cleveland	Philadelphia
Dallas	Providence
Des Moines	Reno
Detroit	Richmond
Indianapolis	Salt Lake City
Jackson	Seattle
Jacksonville	Topeka
Knoxville	Trenton
Minneapolis	Washington

Oklahoma City

Of these, Philadelphia most readily meets all the criteria. Not only is data available from Hoyt but the metropolitan area is comparable to New York. It is small enough to be grasped within the available time, has a tradition almost as long as Boston's, and has been studied enough that data can be obtained from both primary and secondary sources.

b. The other criterion concerned the relationship between the various scales. These scales must not be so large that they smooth over differences nor so small that they ignore similarities. They also must be flexible enough to reflect changes in the relationship between the variables at the different scales.

Data for the Philadelphia Standard Metropolitan Area (PSMA) is available at several different scales: the county, the Planning Analysis Area (groupings of census tracts defined by the various planning bodies for the purpose of organizing data), the census tract, and the block (housing data for cities of Camden, Chester, Philadelphia). The greatest amount of data can be obtained for the Planning Analysis Area (PAA) and for the census tracts. The PAA offers a more strategic scale for organizing data as it is small enough to check upon the homogeneity or heterogeneity of the access zone or sector while large enough to give operational ease in organizing data.

However, in order to determine the relationship between the variables at the different scales, data - where available - will be presented at all scales: from the county through the ecological neighborhood to the particular blocks. In order to test the hypothesis that residential space in metropolitan areas is organized according to access zones or sectors, such access zones and sectors will be defined for the PSMA and the data analyzed within them.

This analysis will occur by constructing a series of overlays which define the access zones and the sectors. These overlays will be utilized to examine the charts upon which

data has been mapped to determine whether this data is organized in terms of a sector or access zones.

Though all sectors and access zones could be examined in detail, a more strategic procedure consists of choosing two sectors which move in opposite directions from the core. By studying both these sectors and the access zones within them in terms of the different scales, their adequacy can be determined. Sectors will be defined by the criteria stated by Hoyt - rent, social status, and the systems of movement - and access zones by the criteria stated by Vernon-Hoover - 15 minute time distance zones from the central core. In the case of Philadelphia this core will not include the entire central city but the central business district. This distinction is based upon the difference in the size of the two Metropolitan Areas; in contrast to Manhattan, the city of Philadelphia held over half of the region's population in 1950.

2. The distribution of the variables within this scale of analysis.
   a. The variables to be examined are those posited by the several approaches. In order to make this examination as clear as possible, they have been grouped into the following categories. In the test each of the categories will be analyzed separately at the different scales. This analysis will occur by summarizing the data available at these scales in a series of charts and tables. Explanatory comments will

be made upon these charts and tables. No conclusions or implications will be stated: they are to be found in Chapter Two. The categories are:

(1.) Distribution of Population.

(2.) Patterns of Access to Work.

(3.) Distribution of variables concerned with physical environment.

  (a.) Land: land use, topography, amount of vacant land.

  (b.) Housing supply: age, condition, type of housing, type of new construction, conversions, mergers and withdrawals, rent and tenure.

  (c.) Environment: schools, shopping centers, architecture, densities.

(4.) Pattern of Government Action*: zoning and urban renewal.

(5.) Distribution of socio-economic variables: occupation, incomes, age structure of family, racial and ethnic origin, class structure, cultural factors, leisure.

(6.) Miscellaneous variables**: influence of real estate promoters, restrictive covenants.

In some cases no information was available and such is recorded.

* Government action included under housing supply.

** Miscellaneous variables included under socio-economic variables.

b. Data concerning these variables - within the different scales - must be so organized that it can be compared to its pattern of distribution in the metropolitan area. In order to develop such a comparison, an index of similarity has been constructed for those variables which can be analyzed in this fashion.

Since the test is concerned with the distribution of the variables throughout the entire metropolitan area, this index compares the distribution of the variable in the particular area of analysis with its overall distribution. It is not a raw percentage figure, however, It is obtained by:

1. Determining the base population of the metropolitan area in reference to the particular class of data under consideration.
2. Determining the percentage of this base population which is present in the area being analyzed.
3. Determining the base population of the metropolitan area for the sub-variable contained within this class of data.
4. Determining the percentage of this base population which is present in the area.
5. Dividing "4" by "2".
6. Multiplying times 10.

For example, the base population for employed persons over 14 in the P.S.M.A. in 1950 was 1,394,114 (excluding farmers and farm laborers). In Planning Analysis Area D for the city of Philadelphia there were 134,434 such persons employed which equals 9.67 %. The base population for the area was 138,931 as far as professional, technical, and kindred workers were concerned. The base population for the PAA was 14,304, a percentage of 10.29. According to step " 5 " above:

$$I = \frac{\%\text{ of base population of SMA for sub-variable}}{\%\text{ of base population of SMA for total class.}} \times 10$$

In this case $I = \frac{10.29}{9.67} = 1.064 \times 10 = 10.64$

Consquently, there is a slightly higher concentration of this sub-variable in the area than in the P.S.M.A.
This index will be determined in selected sectors and access zones for the following variables and sub-variables;

Housing:

Age pripr to 1919.

Number of structures having more than five dwelling units.

Socio - economic variables:

Professional, technical, and kindred workers; clerical and kindred workers; craftsman, foreman, and kindred; operatives; laborers, except farm; age of population in PAA under 14; persons of Russian birth; non-whites.

Some of the variables do not lend themselves to such analysis. Whenever possible, the distribution of the particular variable will still be compared to its metropolitan distribution. For example, data for the changing distribution of population is presented in terms of the percentage of the SMA. The PAA has grown or declined during the base period. PAA D in Philadelphia contained 330.9 thousand people in 1940 or 9.49% of the PSMA; 330.2 thousand in 1950 or 9.03% of the total PSMA; and an estimated 332.0 thousand or 8.5% of the PSMA in 1955. Consequently, between 1940 and 1950 it lost .46% of its population as a percentage of total population and between 1950 and 1955. .53%.

For those variables which cannot be handled in this fashion, other forms of analysis are required. They are so indicated.

3. Time.

   a. Two base periods have been utilized to determine which variables are important in bringing about changes through time, which processes are important, and whether there are different relationships between the variables through time. These periods are:

      (1.) The use of upper class residential space in the PSMA since the colonial period.

      (2.) The distribution of selected variables between 1940 and 1955. This base period was not extended beyond

1955 because of the difficulty of obtaining 1960 data and because highways constructed since this date have outmoded available information concerning zones of access.

By examining the changing patterns of distribution during these time periods the importance of the variables, the processes as well as their relationships can be determined.

Appendix C
The Test of Selected Theories

Before turning to an examination of the categories of variables listed in Appendix B, access zones and sectors within the PSMA must be defined. Charts C-1, C-2, and C-3 show the eight county metropolitan area and its regional relationships; the Planning Analysis Areas within the eight counties; and the Planning Analysis Areas within the city of Philadelphia. (The city is coterminous with the county.) The central business district -PAA-A-is indicated on each of these charts.

Access zones at fifteen minute intervals to the central business district are indicated on Overlays I and II. The time distance is measured in terms of time to the CBD from the PAA.[1] Overlay I defines this time-distance for automobiles; Overlay II for mass transit. Exact times are contained in Appendix C-1.

Analysis of these overlays shows that access zones are not concentric about the central business district.[2] The greatest concentricity occurs in the Pennsylvania counties on Overlay I - automobile access. However, the New Jersey counties on this Overlay are closer to the central business district by time than by airline distance. Consequently, the concentric pattern is skewed east of the Delaware. The pattern illustrated on Overlay II - access by mass transit - shows little evidence of concentricity on either side of the Delaware. First, the zero to fifteen minute zone is divided by a fifteen to thirty minute zone. Second, the Pennsylvania Counties are generally much closer to the CBD by mass transit than by automobile. The time-

distance in these counties for mass transit is skewed: the thirty to forty-five minute zone and the forty-five to sixty minute zone stretch far out into Chester and Montgomery Counties. Third, in contrast to Overlay I, time- distance by mass transit is longer for the New Jersey Counties.

Overlay III exhibits a vastly different pattern for organizing the metropolitan form. It indicates how that form would be structured if it were based upon sectors instead of access zones to the Central Business District. These sectors were constructed by the writer, using the major criteria specified by Hoyt: the segregation between low, intermediate, and high rental areas, based upon class differen - tiations and the system of transportation. To obtain this data median rents and median valuation of housing[3] were used as defined by census tracts in the 1950 Census of Population and Housing. Though Hoyt states that " only maps which show rents by individual blocks can accurately show the gradation of rents downward from the high rental areas, "[4] he actually proceeds to aggregate this block data into his broader categories ... " the data have been presented in a form which will show the main tendencies without the minutiae of detail. "[5] Besides, those areas indicated as having the highest median rent and value con - form to the other criteria - being the homes of the leaders of the community.

The median rent for the PSMA in 1950 was $44.50; the median value $ 7,818.00.[6] Low rental areas were defined as those paying $30.00 a month or less median rent; intermediate as tnose where median rents ranged from $30.00 to $60.00; and high rental areas as those where.

median rents were over $60.00. Though these categories are slightly skewed in terms of containing a larger number of low rental areas, they were chosen deliberately: if the $20-30.00 median rental class is placed in the intermediate rental category there are too few low rental areas to form any pattern.

Low value areas were defined as those in which the median value of homes was less than $3,999.00; intermediate as those in which this value ranged between $4000.00 and $14,999.00; high value as those in which it was over $15,000.00.

By utilizing both rental and value costs, it was possible to develop an image of the distinction between the spread of rental areas in terms of tenure, a distinction which Hoyt did not develop. These areas are indicated on Charts C-4 and C-5.

The use of medians as a measure of defining these areas differs from the averages used by Hoyt. However, since the categories are broad as presently defined, such distinctions in the measure are not overly important. A check of the "average rents" for census tracts in Philadelphia county indicated that there was no great difference between the average and the median for these tracts.

Medians as a measure do pose other problems, in that half those in the census tract are below the median and half above it. In seeking to define rental areas, however - in the broad terms stated by Hoyt - such distinctions are unimportant. These areas, as defined here, will also be examined at the finer grained scale later on in this chapter for Philadelphia where data is available.

Besides, Chart C-6 tends to confirm this distribution of rental areas, as far as high value areas are concerned. This Chart shows the location of Philadelphia's upper class residential areass as defined by a detailed study of those areas.[7] These upper class areas have been analyzed in terms of two criteria: membership in the Social Register and listing in Who's Who. On the basis of these two criteria, the author defines those who belong to the upper class by birth or membership in the Register and those who belong to the elite by attainment. There is a broad distinction between these two, not only in terms of membership, but also in terms of residential location.

As indicated on Chart C-6, in 1940, the upper class tended to reside on the Main Line, in the Chestnut Hill, Penllyn, Whitemarsh areas, the elite in Germantown, West Philadelphia, and Swarthmore, while Rittenhouse Square near the central city and Jenkintown to the north were areas of mixed residence. In general, this distribution conforms to the location of high value areas indicated on Chart C-4 except that there are certain high value areas far out in the metropolitan area which are not mentioned in the class study. It also conforms with the distribution of high rental areas, with the exception of that area in the northern portion of PAA 2 in Delaware county and that in Camden County.

Low rental areas, not low value areas, in contrast, do seem to have moved - at this scale of analysis - either in the opposite direction into New Jersey or else to remain far out on the peripehery of the SMA, while intermediate rental areas have stayed closer into the core.

These areal distinctions can serve to indicate gross sectors in the PSMA. However, such sectors are not yet useful tools for analysis. Hoyt's third major criterion - the system of transportation - must be utilized to refine them. Chart C-1 shows the major radials extending outward from the core. By combining the indices of rent, value, class structure, and system of transportation, the seven sectors indicated in Overlay III were constructed.

These sectors conform as closely as possible - given the fact that data is being organized by Planning Analysis Areas - to Hoyt's criteria. In some instances it was necessary to compromise; for example PAA 6 and PAA 7 in Burlington County were included in Sector VI on the basis of rentals, though in terms of radials they can be placed in Sector VII. These - and other problems - point to methodological difficulties inherent to the use of sectors which are discussed in Chapter II.

The sectors to be examined in some detail in the organization of data are III and VI. III was selected because it is based upon the "main line" with all its social connotations; VI because it contains a high proportion of low rental tracts and because it moves into New Jersey where patterns of accessibility differ.

Consequently, the PAA's to be examined in some detail lie in the following sectors and access zones.

ACCESS ZONE TO CENTRAL BUSINESS DISTRICT.

Sector III	By automobile	By mass transit
Time Distance;		
0-15 minutes	-	Montgomery PAA 1 Delaware PAA 2
15-30 minutes	Montgomery PAA 1 Philadelphia PAA D Delaware	Philadelphia PAA D Delaware PAA 2.
30-45 minutes	PAA 1 Delaware PAA 2.	Chester PAA 1.
45-60 minutes	Chester PAA 1	Chester PAA 2,4,5.
60 minutes and more	Chester PAA 2,4,5,6, 7,8,9	Chester PAA 6,7,8,9.
Sector VI		
0-15 minutes	-	-
15-30 minutes	Camden PAA 1,2,3,6	Camden PAA 1,6
30-45 minutes	Camden PAA 4. Burlington PAA 6	Camden PAA 2,3.
45-60 minutes.	Camden PAA 5	Camden PAA 4,5.
60 minutes and more	Burlington PAA 7.	Burlington PAA 6,7.

Data organized in terms of the several categories developed in Appendix B will now be analyzed at these scales as well as the other scales defined there. The method for studying each category of variables will consist of a summary statement at the beginning of the section devoted to the category, followed by a series of Charts and T bles which contain supporting evidence.

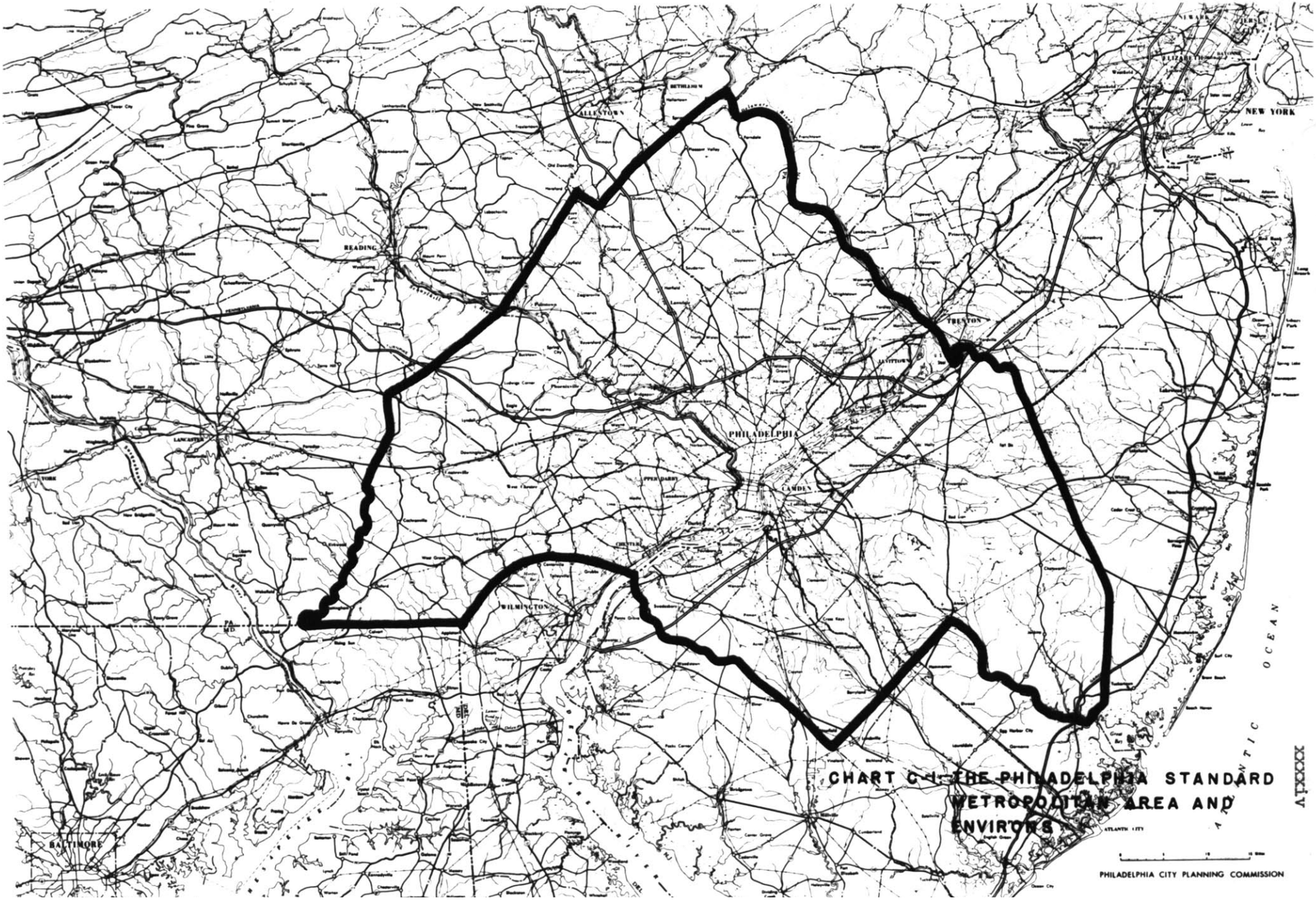


CHART C-1: THE PHILADELPHIA STANDARD METROPOLITAN AREA AND ENVIRONS

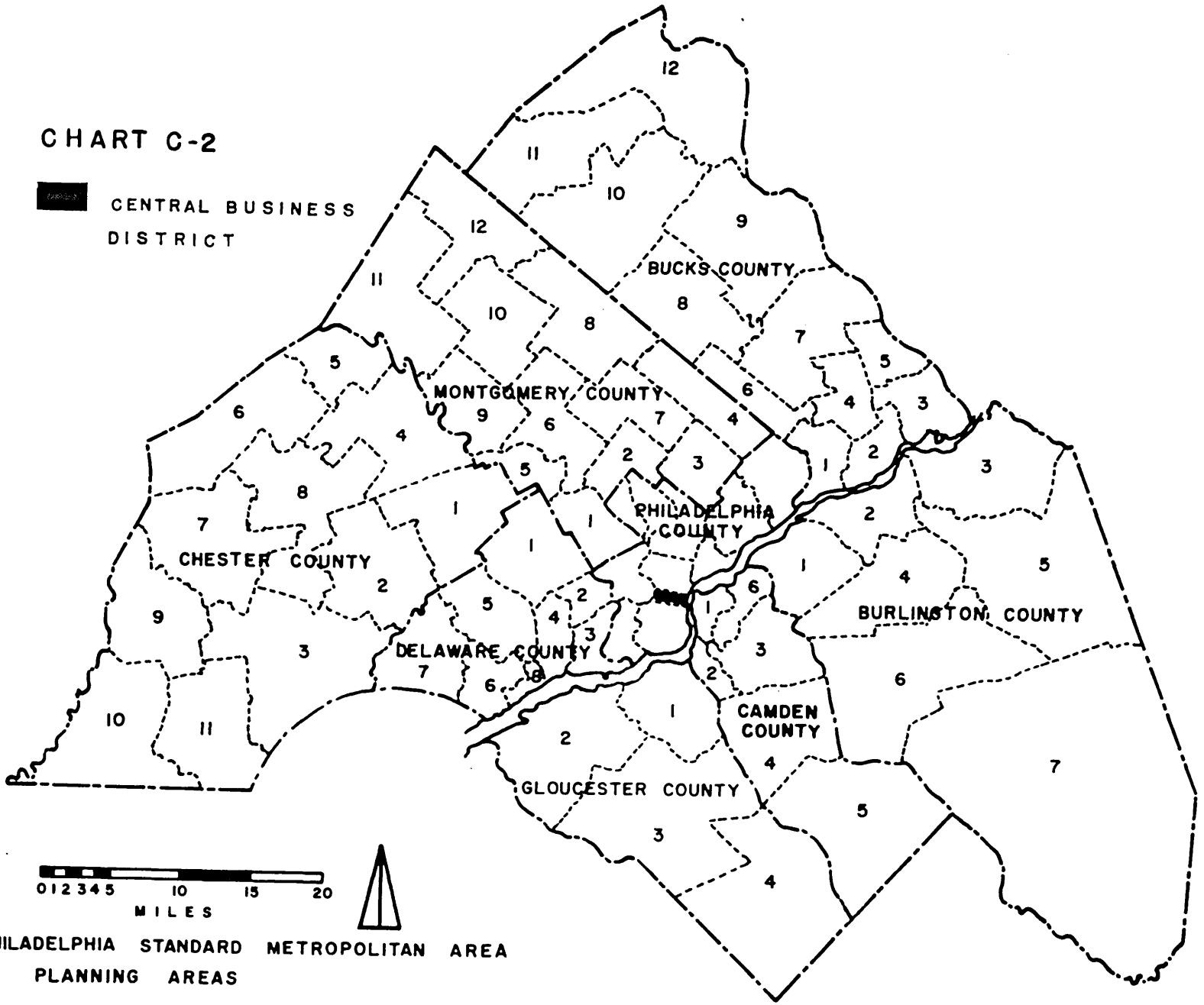
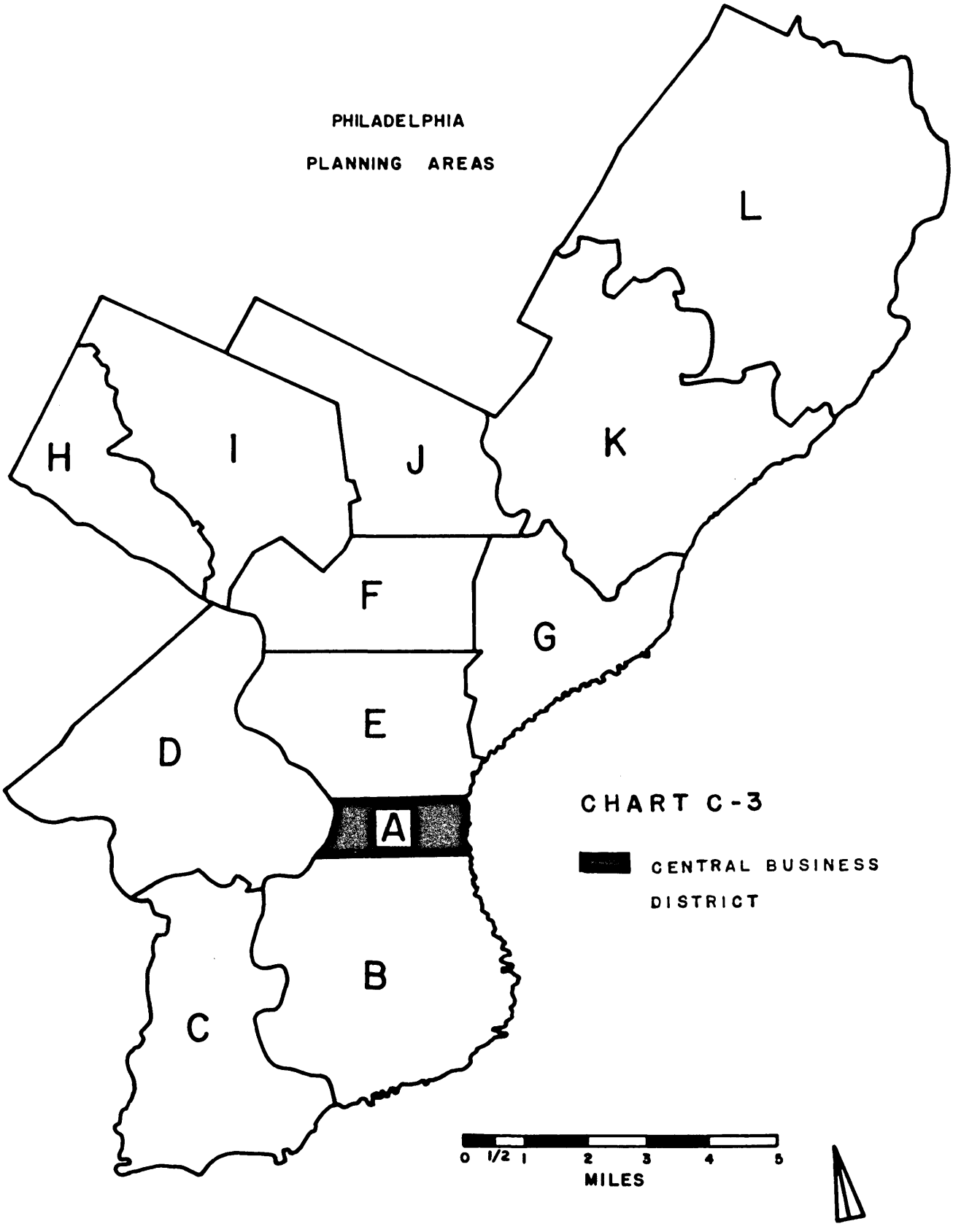


CHART C-2
CENTRAL BUSINESS DISTRICT
BUCKS COUNTY
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS


PHILADELPHIA
PLANNING AREAS
L
K
H
I
J
F
G
E
D
A
B
C
CHART C-3
CENTRAL BUSINESS DISTRICT
0 1/2 1 2 3 4 5
MILES

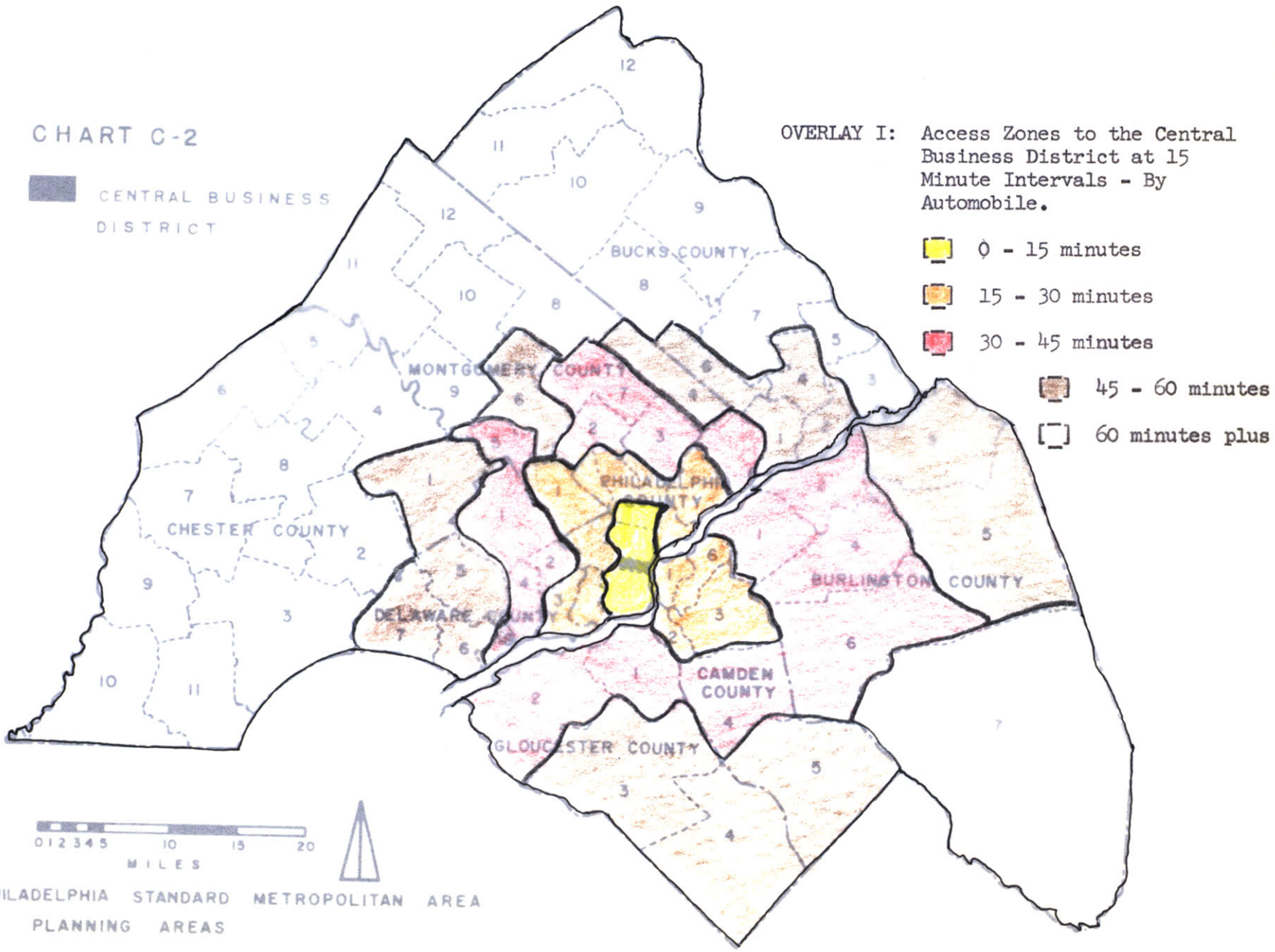


CHART C-2
CENTRAL BUSINESS DISTRICT
OVERLAY I: Access Zones to the Central Business District at 15 Minute Intervals - By Automobile.
0 - 15 minutes
15 - 30 minutes
30 - 45 minutes
45 - 60 minutes
60 minutes plus
BUCKS COUNTY
MONTGOMERY COUNTY
CHESTER COUNTY
DELAWARE COUNTY
PHILADELPHIA COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS

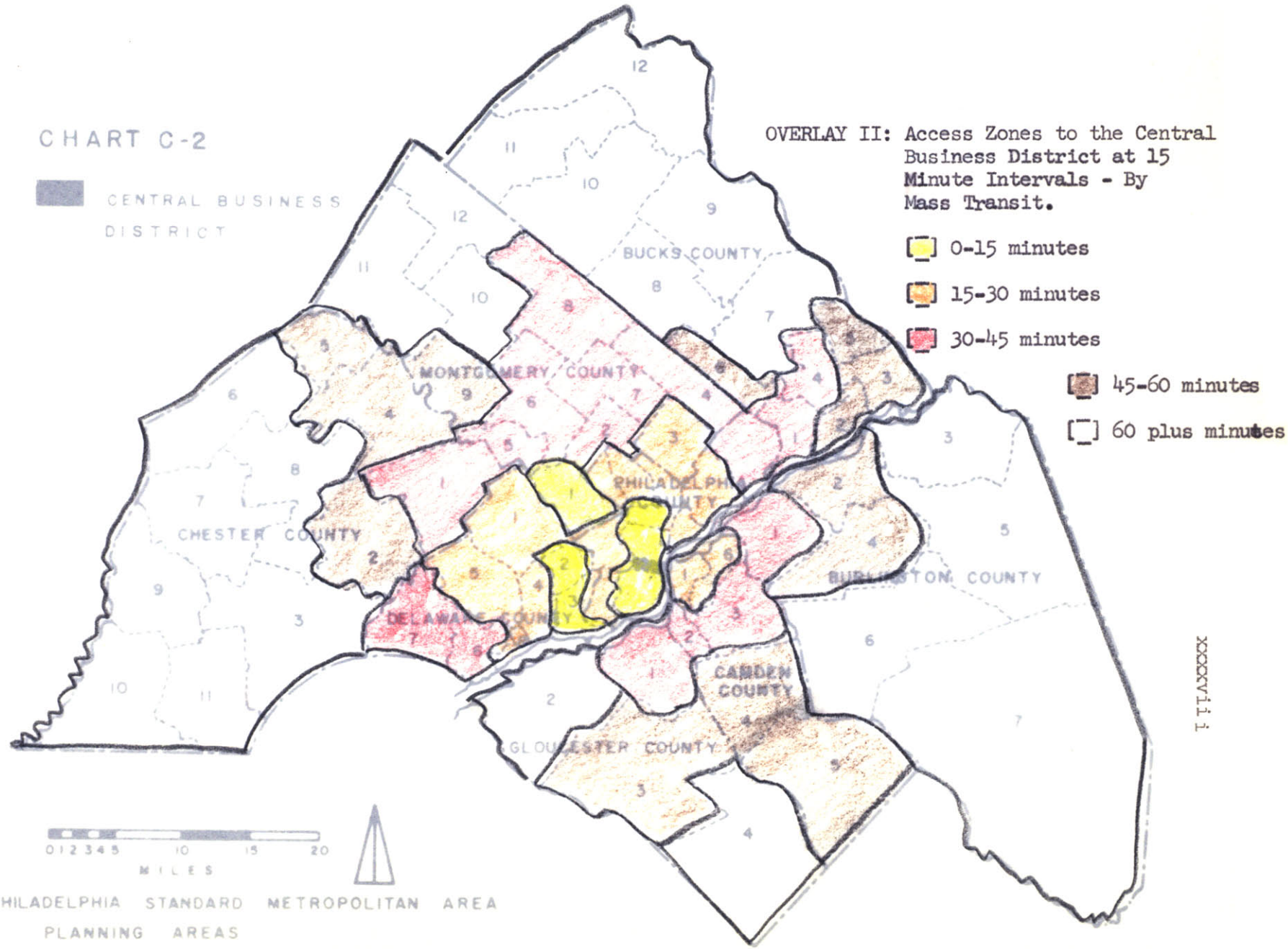


CHART C-2
CENTRAL BUSINESS DISTRICT
OVERLAY II: Access Zones to the Central Business District at 15 Minute Intervals - By Mass Transit.
0-15 minutes
15-30 minutes
30-45 minutes
45-60 minutes
60 plus minutes
BUCKS COUNTY
MONTGOMERY COUNTY
CHESTER COUNTY
DELAWARE COUNTY
PHILADELPHIA COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS

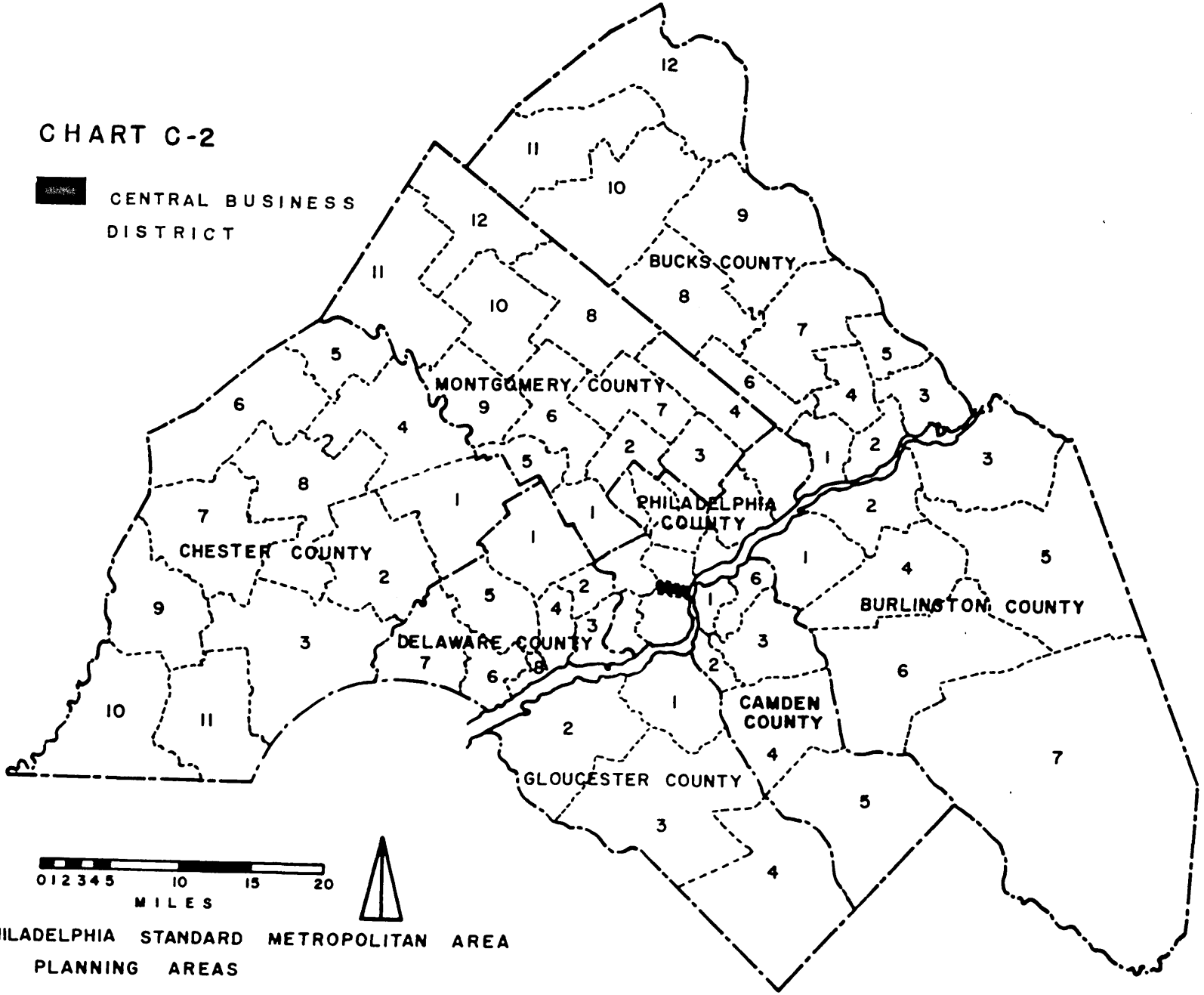


CHART C-2
CENTRAL BUSINESS DISTRICT
BUCKS COUNTY
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS

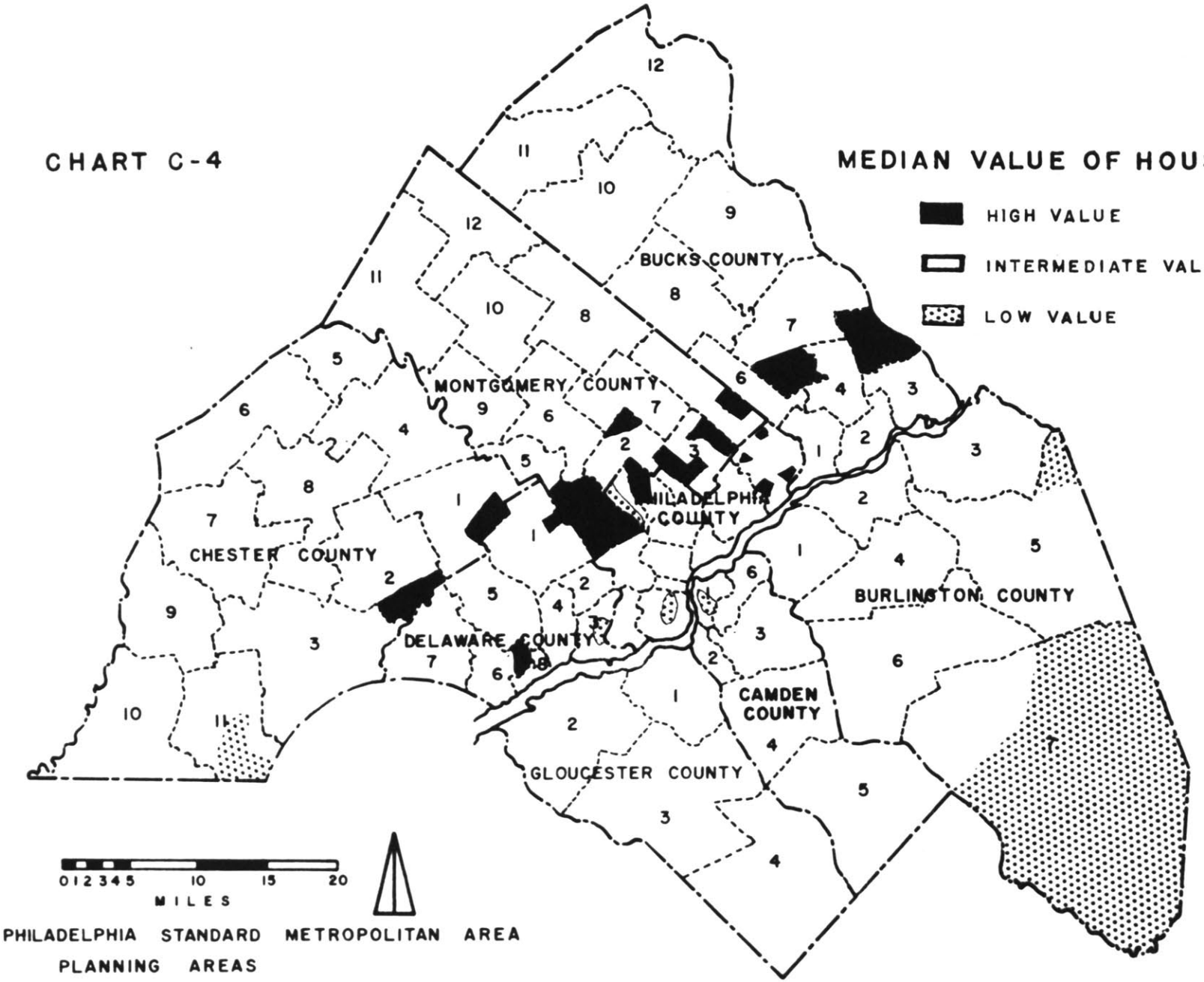


CHART C-4
MEDIAN VALUE OF HOUSING*
HIGH VALUE
INTERMEDIATE VALUE
LOW VALUE
BUCKS COUNTY
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS
* U.S. CENSUS, 1950

CHART C-5

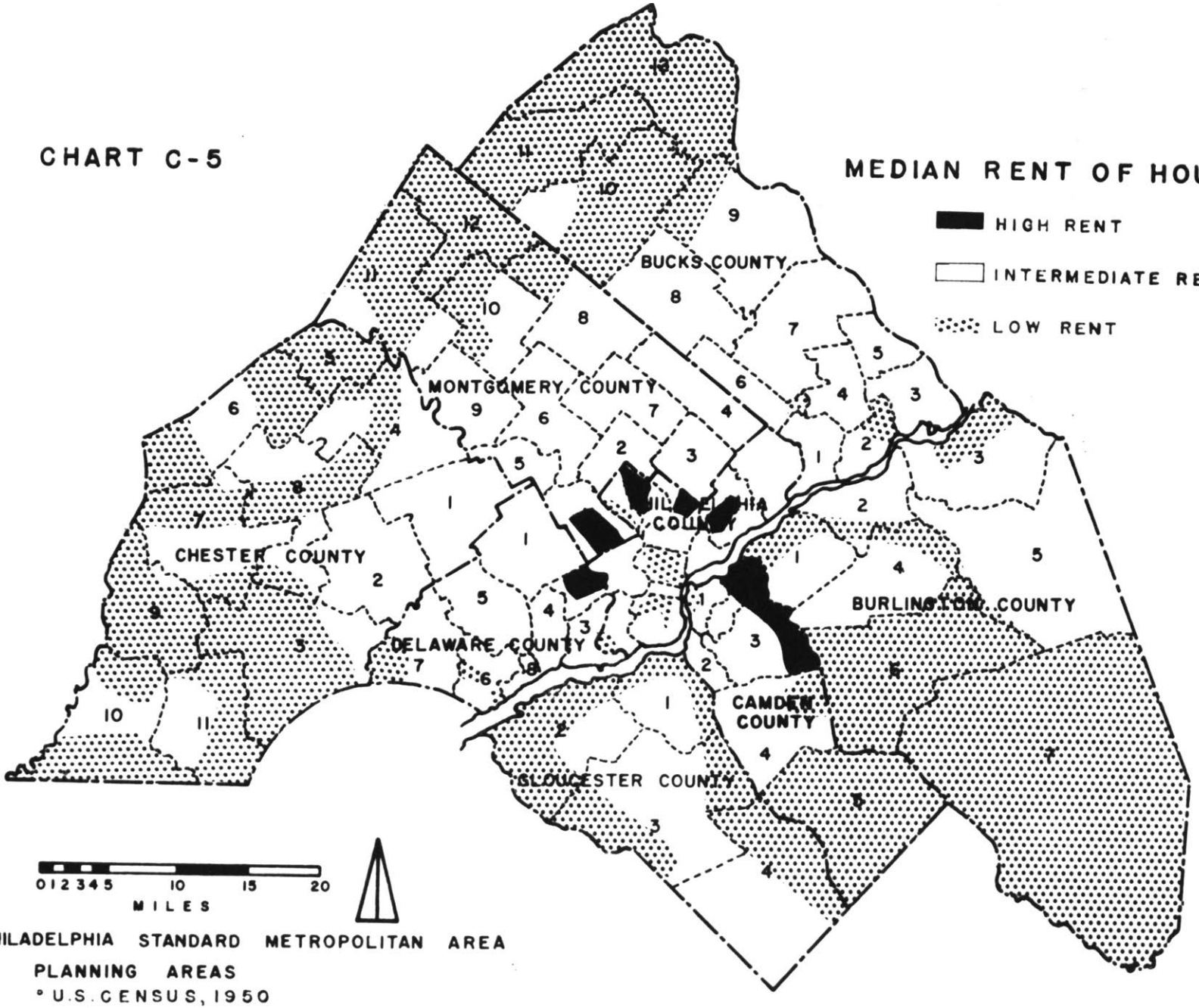
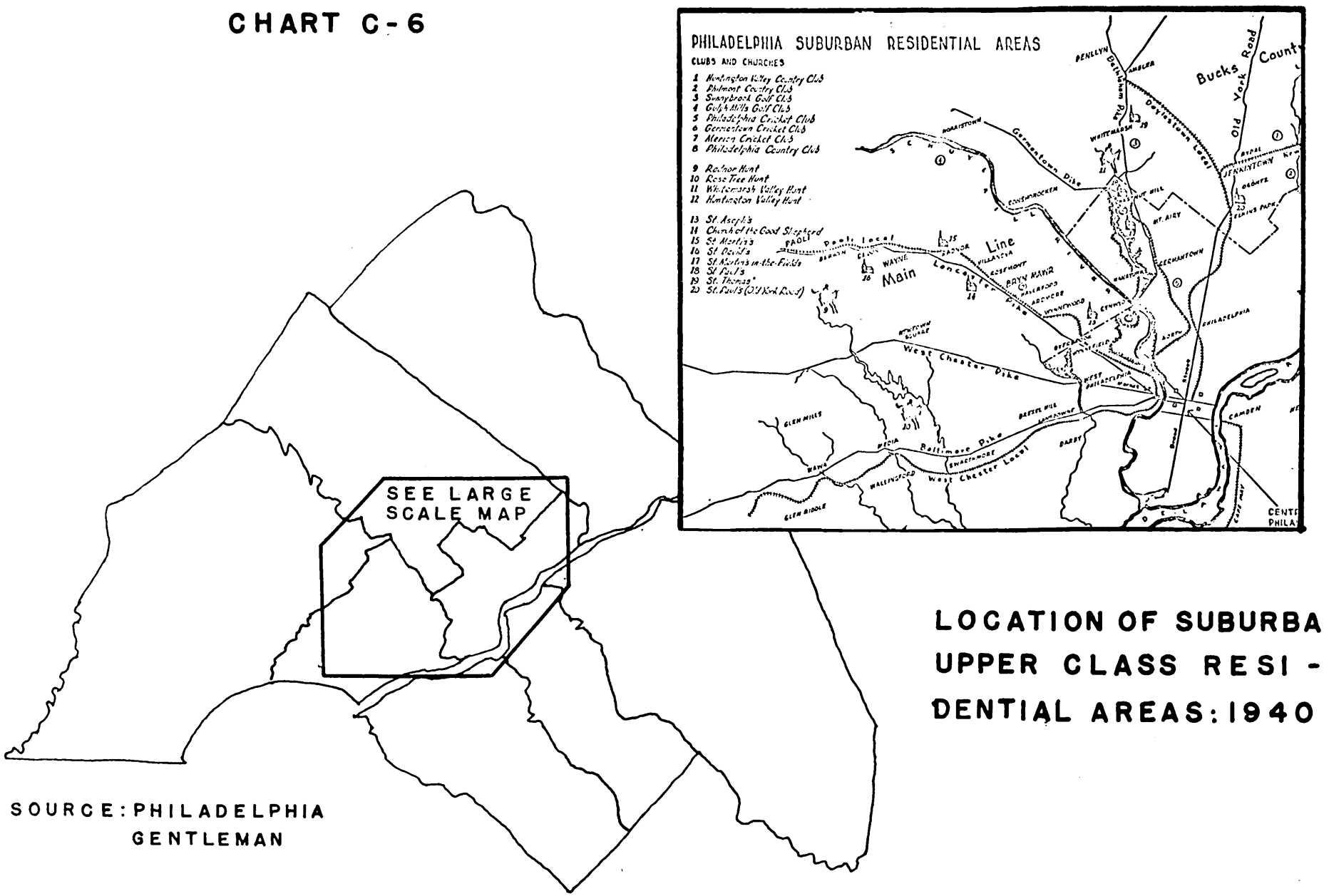

MEDIAN RENT OF HOUSING*
HIGH RENT
INTERMEDIATE RENT
LOW RENT
BUCKS COUNTY
MONTGOMERY COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS
* U.S. CENSUS, 1950

CHART C-6



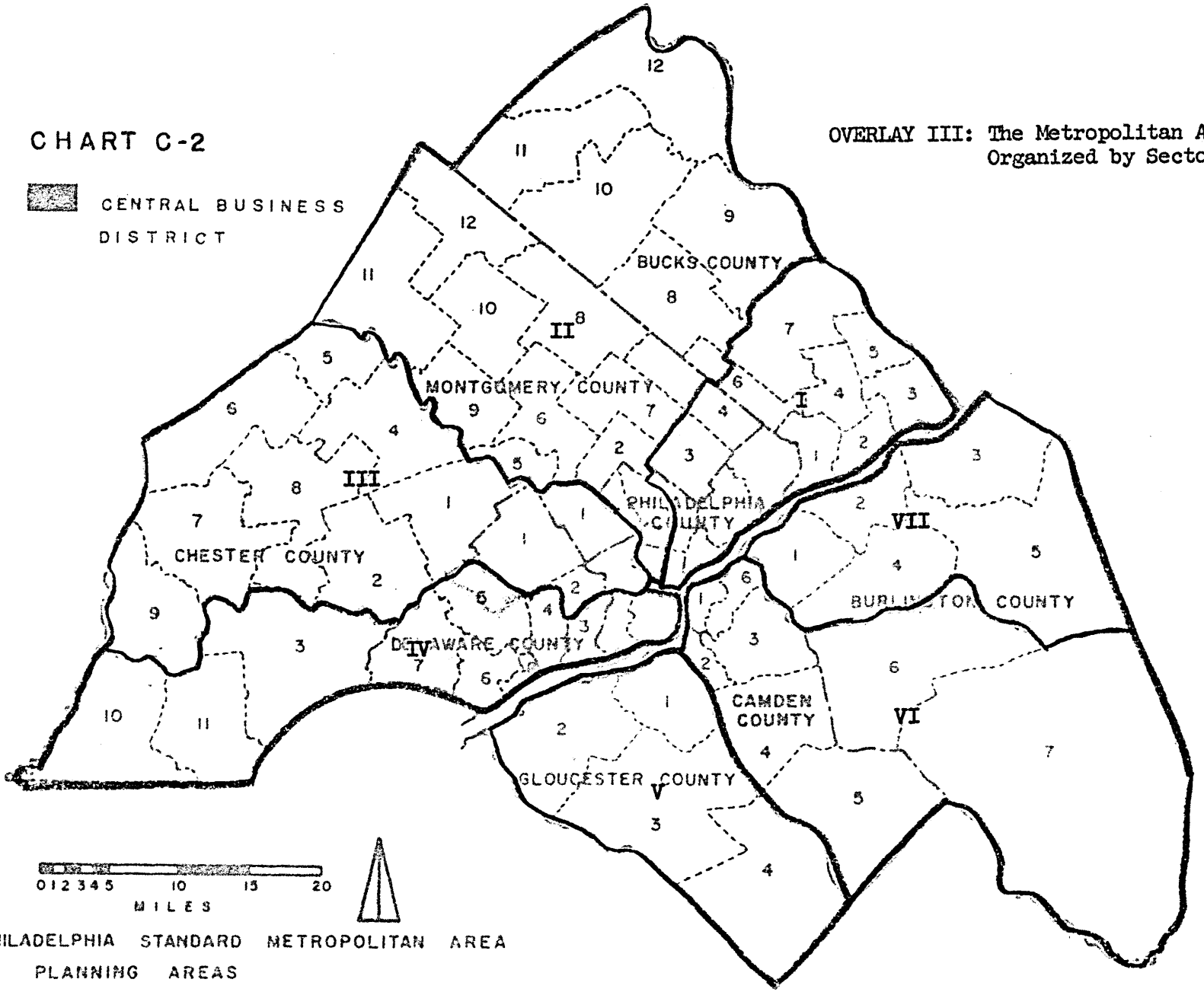
SOURCE: PHILADELPHIA GENTLEMAN

LOCATION OF SUBURBAN UPPER CLASS RESI-DENTIAL AREAS: 1940

CHART C-2

CENTRAL BUSINESS DISTRICT

OVERLAY III: The Metropolitan Area Organized by Sectors.



PHILADELPHIA STANDARD METROPOLITAN AREA PLANNING AREAS

I. POPULATION

1. Distribution of the variable at a fixed moment in time.

Tables I and II indicate that the scale utilized to describe the distribution of the variable influences the manner in which this distribution is perceived. At the county scale emphasis is placed upon the concentration of population in the central city and in the Pennsylvania Counties. At the scale of the sector, emphasis is no longer put upon the core but the radials moving out from the core. The most heavily populated of these radially defined Sectors is "I". Population declines - in rank order - in Sectors II through IV, then falls even more sharply in the New Jersey sectors.

In contrast, when the access zone is used to describe the distribution of the population, emphasis is placed upon the core again but with an important difference: a concentriticy is implied which neither sectors nor counties indicate. However, the zones show what the other two scales deny: the intense concentration of population within forty-five minutes of the Central Business District.

8.

Table III - combining both sector and access zone to describe population in Sectors III and VI - gives a more sensitive statement for it combines the advantages of each scale: sectors show differentiations in intensity of development for different quadrants of the metropolitan area while zones indicate the importance of the circumferential distribution, cutting across all quadrants.

2. Changing distribution of the variable through time.

Table I shows that growth has occurred at a higher rate in the Pennsylvania Counties since 1850, with much of that growth concentrated

in two counties: Montgomery and Delaware. Table IV shows how this pattern shifted between 1950 and 1960. For the first time, Bucks County far exceeded the other counties in both numerical and percentage growth; for the first time the city of Philadelphia lost heavily - a decline of over 100,000 people.

At the smaller scale - as Chart C-7 indicates - this central city loss was not evenly distributed throughout Philadelphia. The losses were concentrated in and near the central business district and to the south and west of the central business district. Sector I - that sector which contained the greatest population according to Table II - held most of the city areas which gained in population. These areas lay in the 15-30 and 30-45 minutes access zones.

At the scale of the PSMA, the redistribution of population - organized around the PAA - is indicated in Charts C-8 and C-9. Between 1940 and 1950 both the high growth and high loss areas were concentrated in and about the core. One of the high growth areas - PAA L was in Sector I; the other - PAA Delaware 2 - in Sector III. Both of these lay in the 30-45 minute access zone. Areas of loss were contained in all sectors within 30 minutes from the CBD. Areas of medium growth were spread throughout the PSMA except for the periphery where areas of relative loss were concentrated.

The growth pattern between 1950-55 differed. Areas of loss were not only centered in the core, they also lay in the smaller nodes out from it, particularly in Sectors III and IV. Growth areas had spread out to the periphery and, again, were concentrated in

Sectors I and III.

Table III refines this growth pattern for the base years for the particular Sectors under consideration. As it indicates, Sectors III and VI population has consistently increased in all access zones, except for the 15-30 minute zone in Sector III. Here, population declined, indicating a shift into the outer zones.

These changes in population were not as homogeneous as the scale utilized here would suggest. Charts C-X and C-XI show the growth and decline of population for these base years as it occurred when defined by census tracts. According to this scale of analysis the gain PAA Philadelphia D registered between 1940 and 1950 was not distributed evenly throughout the PAA. Though it grew by some 30,000 in these base years, some tracts registered high losses. Between 1950 and 1955 it only gained an estimated 2000 people, yet no greater losses were recorded in these or other tracts in the PAA. Consequently, the process of change has been one of decreasing growth not shifts resulting from emigration. Moreover, the areas of change have remained approximately constant throughout these years: certain tracts continue to grow, others continue to loose.

TABLE C-I

POPULATION OF THE PHILADELPHIA STANDARD METROPOLITAN AREA, BY COUNTIES; 1850 TO 1950

Numerical Increase, Percentage Increase, and Percentage of Total Area Population

Year	Metropolitan Area	Bucks Pa.	Chester Pa.	Delaware Pa.	Montgomery Pa.	Philadelphia Pa.	Burlington N.J.	Camden N.J.	Gloucester N.J.
					POPULATION				
1950	3,671,048	144,620	159,141	414,234	353,068	2,071,605	135,910	300,743	91,727
1940	3,199,637	107,715	135,626	310,756	289,247	1,931,334	97,013	255,727	72,219
1930	3,137,040	96,727	126,629	280,264	265,804	1,950,961	93,541	252,312	70,802
1920	2,714,271	82,476	115,120	173,084	199,310	1,823,779	81,770	190,508	48,224
1910	2,268,209	76,530	109,213	117,906	169,590	1,549,008	66,565	142,029	37,368
1900	1,892,128	71,190	95,695	94,762	138,995	1,293,697	58,241	107,643	31,905
1890	1,577,720	70,615	89,377	74,683	123,290	1,046,964	56,455	87,687	28,649
1880	1,293,823	68,656	83,481	56,101	96,494	847,170	53,093	62,942	25,886
1870	1,056,343	64,336	77,805	39,403	81,612	674,022	51,410	42,963	24,792
1860	903,583	63,578	74,578	30,597	70,500	565,529	45,900	31,733	21,168
1850	697,541	56,091	66,438	24,679	58,291	408,762	43,203	25,422	14,655
					NUMBER INCREASE				
1950	471,411	36,905	23,515	103,478	63,821	140,271	38,897	45,016	19,508
1940	62,597	10,988	8,997	30,492	23,443	-19,627	3,472	3,415	1,417
1930	422,769	14,251	11,509	107,180	66,494	127,182	11,771	61,804	22,578
1920	446,062	5,946	5,907	55,178	29,720	274,771	15,205	48,479	10,856
1910	376,081	5,340	13,518	23,144	30,595	255,311	8,324	34,386	5,463
1900	314,408	575	6,318	20,079	15,705	246,733	1,786	19,956	3,256
1890	283,897	1,959	5,896	18,582	26,796	199,794	3,362	24,745	2,763
1880	237,480	4,320	5,676	16,698	14,882	173,148	1,683	19,979	1,094
1870	152,760	758	3,227	8,806	11,112	108,493	5,510	11,230	3,624
1860	206,042	7,487	8,140	5,918	12,209	156,767	2,697	6,311	6,513
1850-1900	1,194,587	15,099	29,257	70,083	80,704	884,935	15,038	82,221	17,250
1900-1950	1,778,920	73,430	63,446	319,472	214,073	777,908	77,669	193,100	59,822
1850-1950	2,973,507	88,529	92,703	389,555	294,777	1,662,843	92,707	275,321	77,072
					PERCENT INCREASE				
1950	14.7	34.3	17.3	33.3	22.1	7.3	40.1	17.6	27.0
1940	2.0	11.4	7.1	10.9	8.8	-1.0	3.7	1.4	2.0
1930	15.6	17.3	10.0	61.9	33.4	7.0	14.4	32.4	46.8
1920	19.7	7.8	5.4	46.8	17.5	17.7	22.8	34.1	29.1
1910	19.9	7.5	14.1	24.4	22.0	19.7	14.3	31.9	17.1
1900	19.9	0.8	7.1	26.9	12.7	23.6	3.2	22.8	11.4
1890	21.9	2.9	7.1	33.1	27.8	23.6	6.3	39.3	10.7
1880	22.5	6.7	7.3	42.4	18.2	25.7	3.3	46.5	4.4
1870	16.9	1.2	4.3	28.8	15.8	19.2	12.0	35.4	17.1
1960	29.5	13.3	12.3	24.0	20.9	38.4	6.2	24.8	44.4
1850-1900	171.3	26.9	44.0	284.0	138.5	216.5	34.8	323.4	117.7
1900-1950	94.0	103.1	66.3	337.1	154.0	60.1	133.4	179.4	187.5
1850-1950	426.3	157.8	139.5	1,578.5	505.7	406.8	214.6	1,083.0	525.9
					PERCENT OF TOTAL AREA				
1950	100.0	3.94	4.34.	11.28	9.62	56.43	3.70	8.19	2.50
1940	100.0	3.37	4.24	9.71	9.04	60.36	3.03	7.99	2.26
1930	100.0	3.08	4.04	8.93	8.47	62.19	2.98	8.04	2.26
1920	100.0	3.04	4.24	6.38	7.34	67.19	3.01	7.02	1.78
1910	100.0	3.37	4.81	5.20	7.48	68.29	2.93	6.26	1.65
1900	100.0	3.76	5.06	5.01	7.35	68.37	3.08	5.69	1.69
1890	100.0	4.48	5.66	4.73	7.81	66.35	3.58	5.56	1.82
1880	100.0	5.31	6.45	4.34	7.46	65.47	4.10	4.86	2.00
1870	100.0	6.09	7.37	3.73	7.73	63.81	4.87	4.07	2.35
1860	100.0	7.04	8.25	3.39	7.80	62.59	5.08	3.51	2.34
1850	100.0	8.04	9.52	3.54	8.36	58.60	6.19	3.64	2.10

Source: U.S.MCensus, Population Figures Adjusted for County Areas as of 1950

Prepared by Philadelphia City Planning Commission, Division of Planning Analysis, August 1953.

TABLE 10-II

Distribution of Population: Sectors

and Access Zones: 1950

Sector I	Population 993,342	% of SMA Population 27.1
II	773,452	21.2
III	671,966	18.6
IV	683,726	18.7
V	91,727	2.5
VI	312,200	8.5
VII	123,610	3.4

Access Zone	Auto	% Total Cum.	Mass Transit	Total Cum
0-15 min.	889,883	25.1	1,031,583	27.9
15-30 min.	1,468,687	66.5	1,731,699	74.5
30-45 min.	612,336	83.8	425,676	86.0
45-60	249,000	91.0	225,550	92.0
60 plus	325,961	100	294,250	100*

Note: *= rounded off

Source: Technical Memorandum #3, Urban Traffic & Transportation Board, Table 13.

TABLE C-III

Distribution of Population

Within Sectors III and VI

1940, 1950, and 1955.

1950:	Sector III				Sector VI			
	Auto-mobile	% PSMA Cumu-lative	Mass Transit	% PSMA Cumu-lative	Auto-mobile	% PSMA Cumu-lative	Mass Transit	% PSMA Cumu-lative
Access Zone								
0-15			166,700	4.5				
15-30	384,486	10.5	392,916	15.27	263,500	7.2	175,000	4.8
30-45	175,100	15.3	18,000	15.8	35,800	8.2	88,500	7.2
45-60	18,000	15.8	51,250	17.2	8,400	8.4	36,400	8.2
60plus	105,000	18.6	53,750	18.6	4,500	8.5	12,300	8.5
1940:								
0-15			123,800	3.9				
15-30	348,652	10.9	347,552	14.7	223,600	7.0	158,300	4.9
30-45	122,700	14.7	13,900	15.3	28,300	7.9	65,300	7.0
45-60	13,900	15.2	47,650	16.8	7,900	8.1	30,400	7.9
60plus	93,900	18.1	46,250	18.1	3,500	8.2	11,300	8.2
1955:								
0-15			178,000	4.6				
15-30	394,000	10.14	415,400	15.3	275,700	7.1	178,200	4.6
30-45	199,400	15.3	23,500	15.9	45,400	8.3	97,500	7.1
45-60	23,500	15.9	64,300	17.5	11,300	8.6	45,300	8.3
60plus	121,000	19.0	56,700	19.0	6,100	8.7	17,500	8.7

Source: Technical Memorandum #3 Urban Traffic and Transportation Board, Table 13.

TABLE C-IV

Changes in Population: Pennsylvania Counties

1950 - 1960

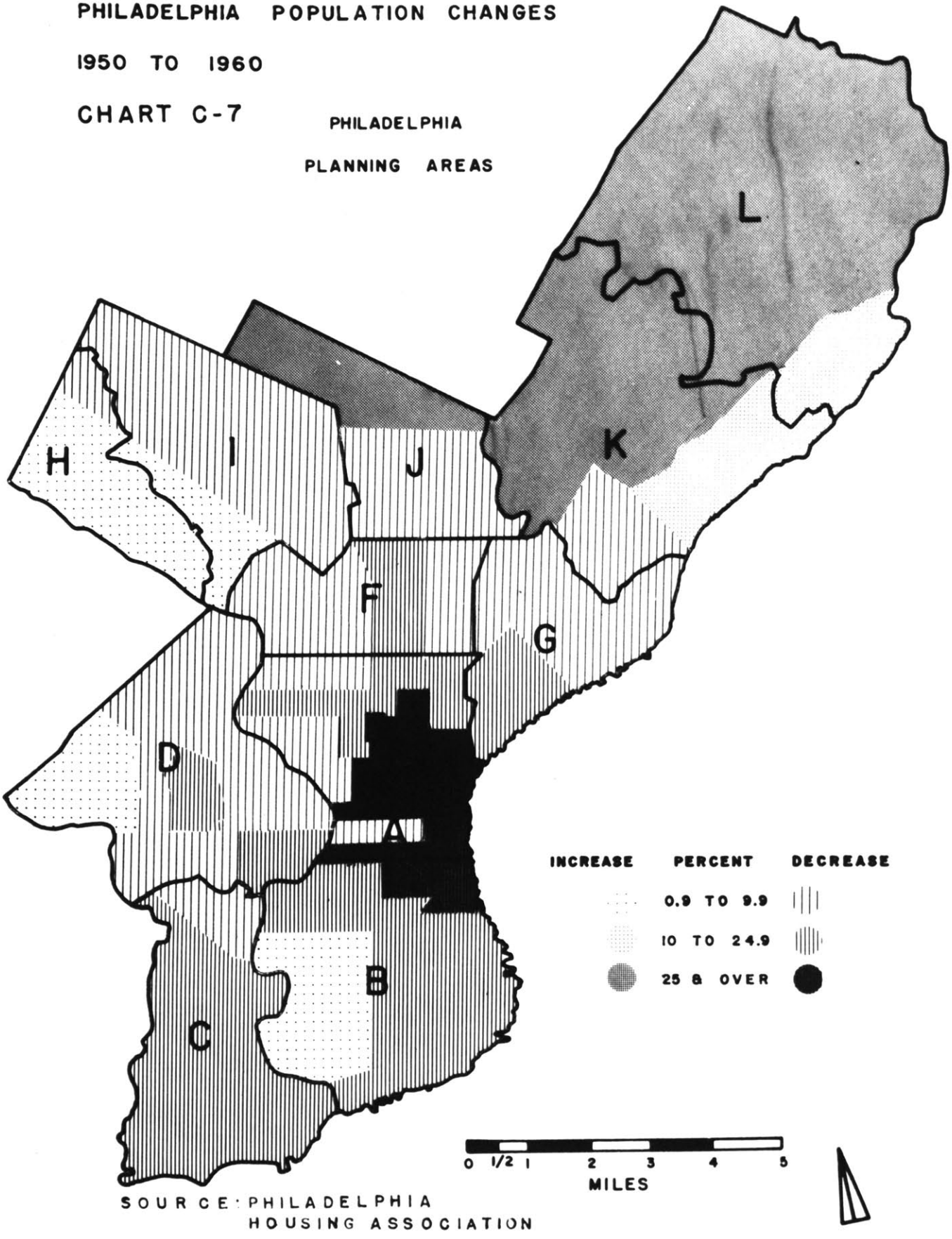
	Bucks	Chester	Delaware	Montgomery	Philadelphia
Population 1960	307,560	207,746	551,122	489,723	1,971,341
Numerical Change	163,300	48,605	136,888	136,655	-100,264
% Increase or Decrease	113.2	30.5	33.0	38.7	-4.8

Source; Preliminary release, U. S. Census, 1960

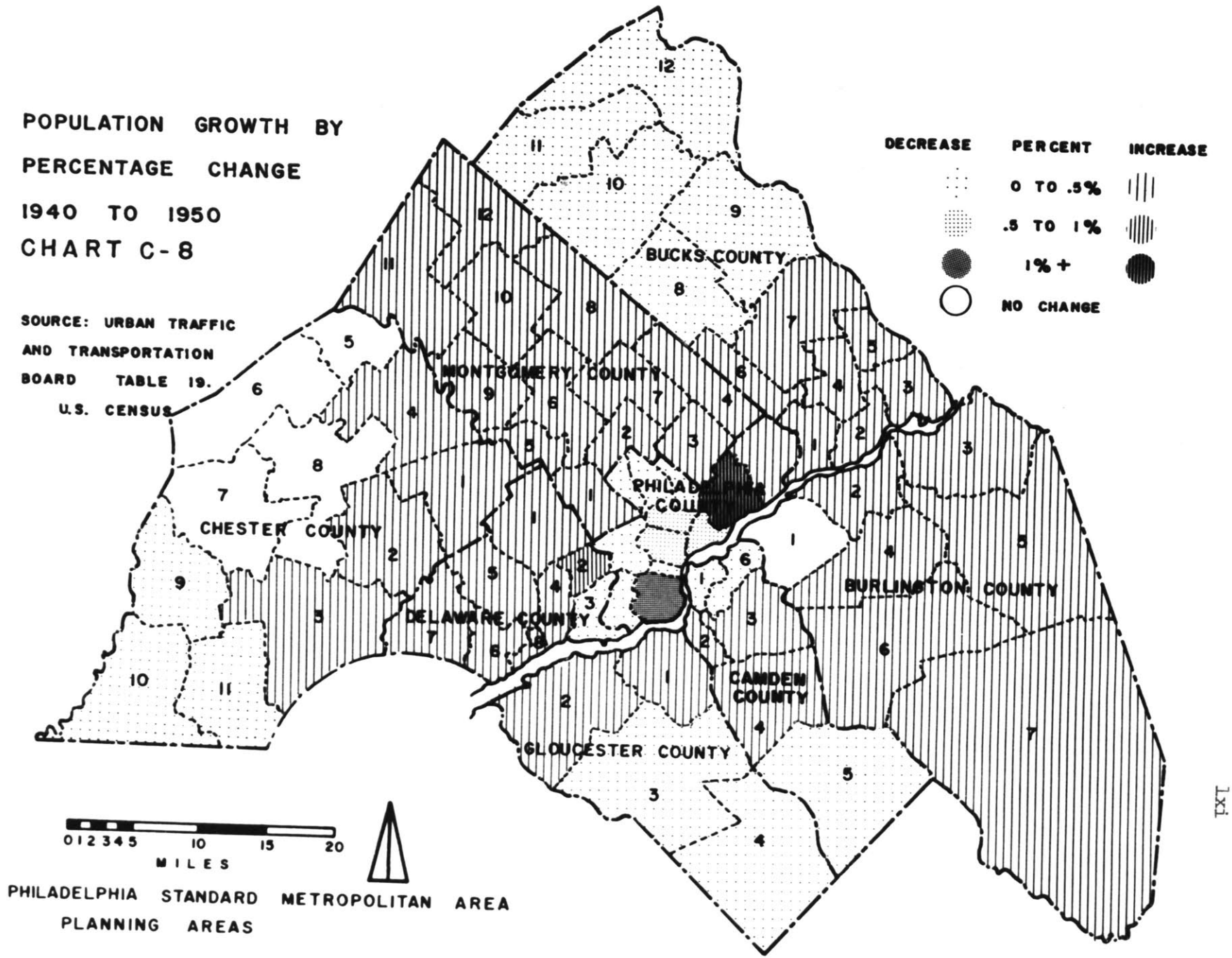
PHILADELPHIA POPULATION CHANGES

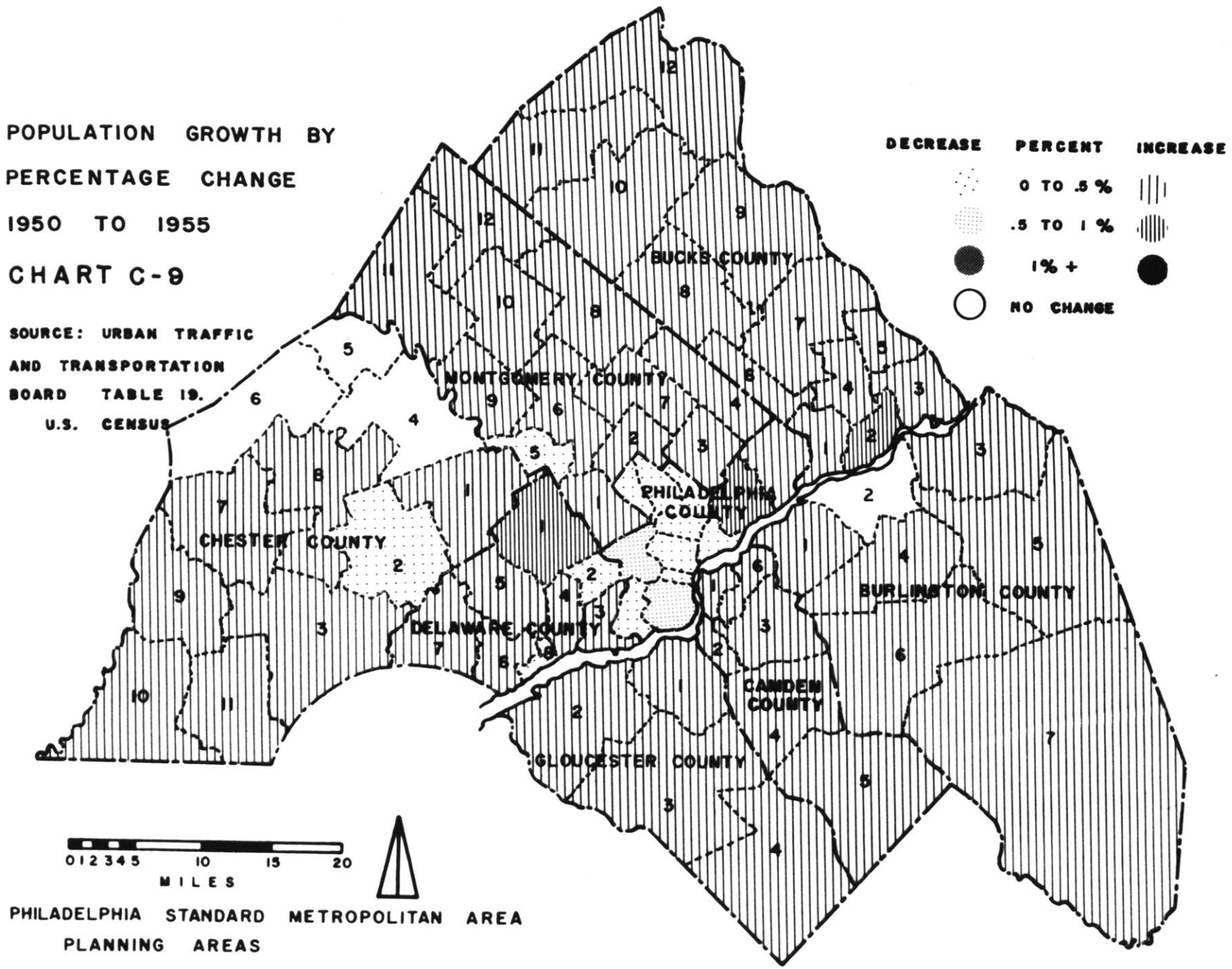
1950 TO 1960

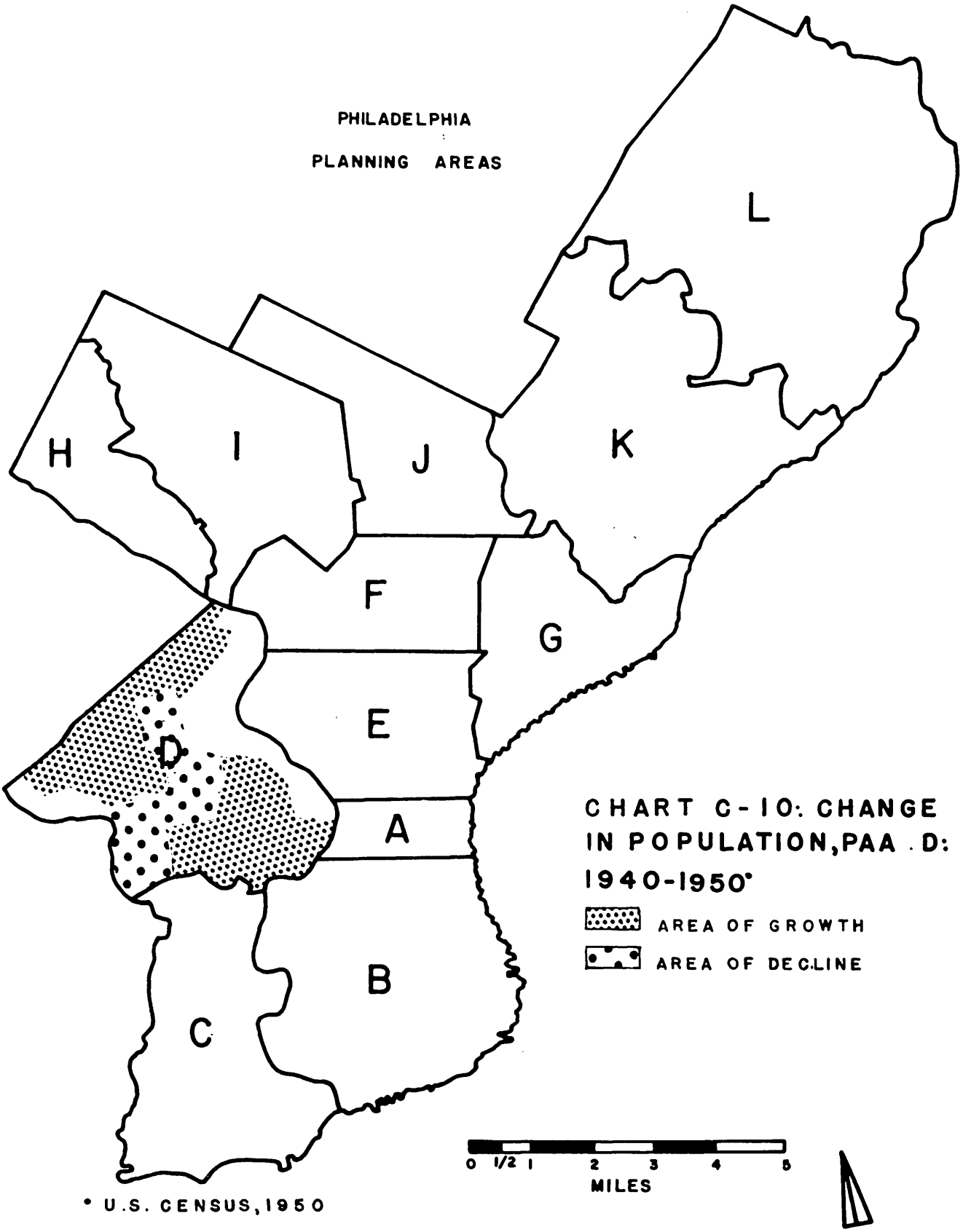
CHART C-7



SOURCE: PHILADELPHIA HOUSING ASSOCIATION


POPULATION GROWTH BY
PERCENTAGE CHANGE
1940 TO 1950
CHART C-8
SOURCE: URBAN TRAFFIC AND TRANSPORTATION BOARD TABLE 19. U.S. CENSUS
DECREASE
PERCENT
INCREASE
0 TO .5%
.5 TO 1%
1% +
NO CHANGE
BUCKS COUNTY
MONTGOMERY COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS


POPULATION GROWTH BY
PERCENTAGE CHANGE
1950 TO 1955
CHART C-9
SOURCE: URBAN TRAFFIC AND TRANSPORTATION BOARD TABLE 19. U.S. CENSUS
DECREASE
PERCENT
INCREASE
0 TO .5 %
.5 TO 1 %
1% +
NO CHANGE
BUCKS COUNTY
MONTGOMERY COUNTY
PHILADELPHIA COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS


PHILADELPHIA
PLANNING AREAS
L
H
I
J
K
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E
D
A
B
C
CHART C-10: CHANGE IN POPULATION, PAA D: 1940-1950*
AREA OF GROWTH
AREA OF DECLINE
0 1/2 1 2 3 4 5
MILES
* U.S. CENSUS, 1950

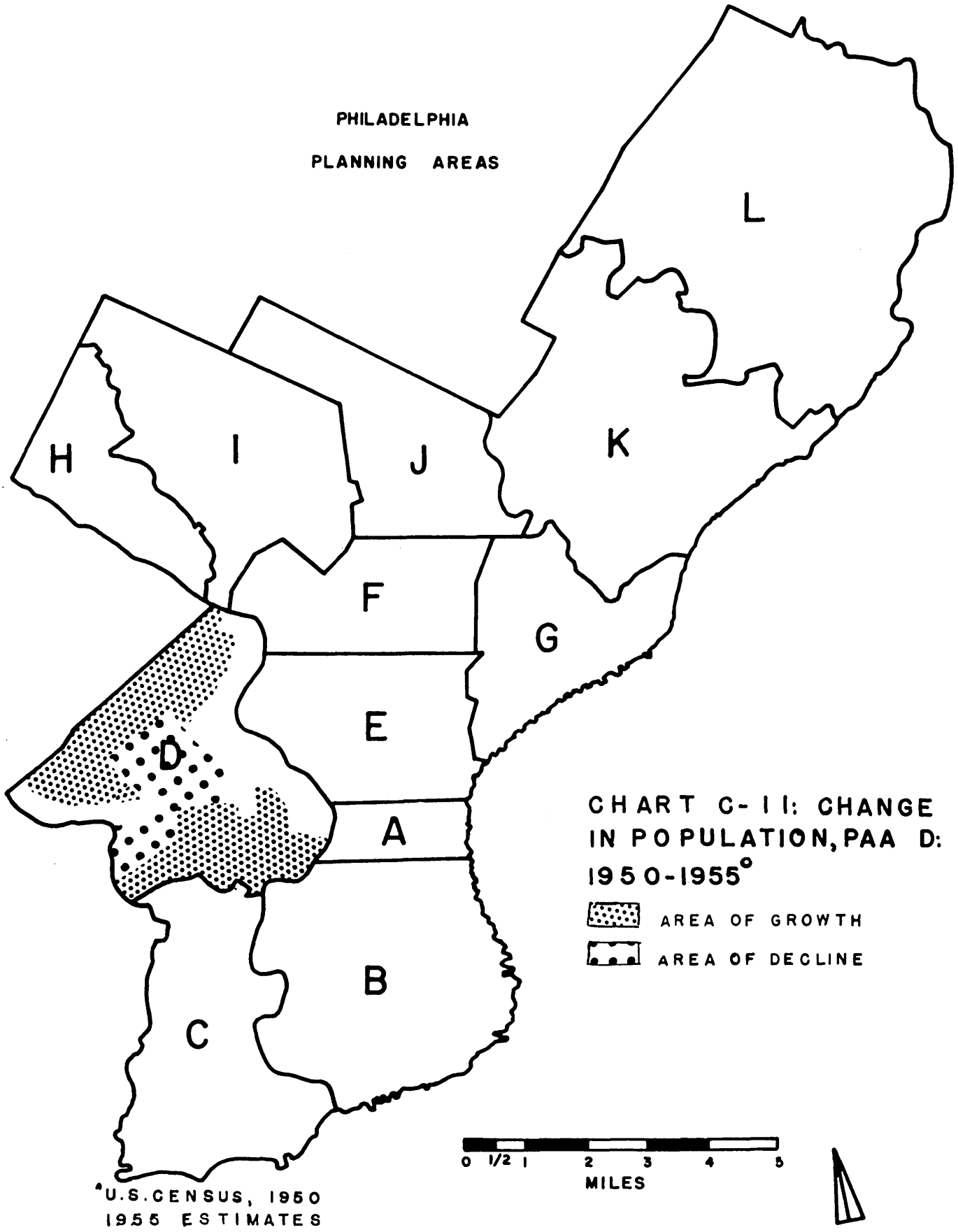
PHILADELPHIA
PLANNING AREAS
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CHART C-11: CHANGE IN POPULATION, PAA D: 1950-1955*
AREA OF GROWTH
AREA OF DECLINE
0 1/2 1 2 3 4 5
MILES
*U.S. CENSUS, 1950
1955 ESTIMATES

III. Accessibility to Work

1. Distribution of jobs in the PSMA.

Before considering the specific role of access to work in determining the distribution of residential space in the PSMA, the location of jobs must be established at both a fixed moment in time and as changing through time. Though Table V shows how jobs have shifted outwards from the central city since 1929, Table VI shows that a high proportion of both manufacturing and non-manufacturing jobs were still concentrated near the core in the base year - 1950. The central business district alone contained almost 50% of all non-manufacturing jobs in that year.

This Table also illustrates the difference when the data is organized by both sectors and access zones. The former show the concentration of jobs in Pennsylvania, especially to the north in Sector I. They also show how non-manufacturing jobs tend to agglomerate in Sectors I, II, and III, while manufacturing jobs concentrate in Sectors I, II, and IV. The use of access zones misses this radial differentiation but shows the high number of jobs within thirty minutes from the CBD. When compared to Table I, it also points the way jobs are more concentrated than people. Table VII - for Sectors III and VI only -- confirms this job density.

Complete information could not be obtained concerning specific locational shifts of jobs within the PSMA except for industrial workers in Pennsylvania. For such workers, "the general pattern of industry locational change indicates a slowly declining percentage of total

employment in Philadelphia... in general most industrial movement has been in a northerly direction, both within the city and in the entire area... expansion to the south and east is cut off by the Delaware River... to the southwest encounters the already built-up industrial areas of Delaware County... to the west must hurdle the already built-up residential areas of Darby and the Main line."[9]

2. Patterns of movement to these jobs.

Evidence concerning the distribution of households and jobs is contained in Table C-VIII[10] which shows the number of workers who live in an area, the number of jobs in that area, the number of workers who leave the area for work, and the number who commute into the area for work. The most striking fact is the change in the levels of an areas' self-sufficiency as one moves out from the core. In Sectors II and III, for example, PAA Philadelphia D exports 72% of its resident labor force and imports 64% of its employed labor force; lower Montgomery County - a little further out - only exports 70% of its residents and imports 49% of its labor force; and upper Montgomery County - on the periphery of the PSMA - exports only 32% of its residents while importing only 22% of its labor force.

Not only are these areas distant from the core more self-sufficient in terms of labor but also they tend to send a smaller percentage into the central city. As indicated in Table C-IX, of the 49,000 workers who reside in upper Montgomery County, less than 5000 commute to the central city; almost 34,000 work within the area; 8000 commute to lower Montgomery County; and the largest percentage of the remainder commute to Chester County. The tendency to remain in one's

area or commute to the one closest to it is strongest at the periphery of the PSMA.

The closer the area to the CBD, the less this pattern occurs. Workers who reside in PAA Philadelphia B,D,D,E,F, and G (the most industrialized areas) have their jobs dispersed throughout the central city. Though some jobs are in the PAA in which they reside and some are in the adjacent PAA, this tendency is not as noticeable as in the suburban periphery.[11]

Those who live out and work out also have the shortest median commuting time - 20 minutes - while those who live in and work in have a longer median commuting time - 28 minutes. Even longer times are experienced by that 29% of the population which lives out and works in and the longest times of all - 47 minutes by that 7% of the population which lives in and works out.[12]

These median work-times are not only influenced by job locations but also be certain socio-economic characteristics, particularly incomes, occupations, and racial factors. In the city, those with the lowest and highest incomes had the shortest journey to work while in the suburbs those with higher incomes tended to have a longer journey to work.[13] Home owners also had a longer journey to work than renters. In general as indicated in Table C-X, low paying jobs were concentrated in the central city as were low income households. Higher paying jobs were somewhat more dispersed except for the exceedingly high percentage of such jobs located in the central business district. Higher income residences also tended to be dispersed - particularly in the 30-45 minute access zone to the CBD - as typified by lower Montgomery County.

Distinctions between commutation patterns as reflected in income are similar to patterns involving occupations. Table C-XI shows that of those who live in the suburbs, the professionals and managers have the longest commute; in the city theirs is the shortest. The most disadvantaged groups residing in the city are the clerical, sales, and foreman --those whose jobs are largely located in the central city but who cannot afford - or do not wish - to escape it.

Regardless of income, tenure, or occupation, however, the Negroes are the most disadvantaged group. Table C-XII shows that of all groups - except for the small number of Negro professionals and proprietors - Negroes had the longest distance to travel, presumably because their residences are concentrated while their jobs are dispersed.

Though somewhat out of date, Table C-XIII gives additional evidence of the limited "pull" of the core. Up to a physical distance of ten miles - approximately fifteen to thirty minutes commuting time - the core attracts large numbers of people. Beyond this distance, the core possesses an extremely slight control over population, as far as the functions mentioned in this Table are concerned.

A final indication of the meaning of access to work to the distribution of residential space is found in the role which such access plays in household mobility. Of the 330, 807 household heads who moved in the two year period from January 1, 1953 to December 31, 1955, only "one percent of all movers found a new job as a direct consequence of movement of residence... nine percent of all residential movements in the suburbs and five percent of all such moves in the city

of Philadelphia were due to a change in employment location ...a move of one location, however, very seldom implies a move of the other location, but rather the worker is more apt to stretch or contract the length of his journey to work, irrespective of the location of his home in the PSMA."[14]

TABLE C-V
*

Philadelphia's Proportion of Employment

in the S.M.A.: for Selected Trades - 1929 to 1954.

	1929	1938	1949	1954
Retail Trade	79.2	70.4	67.8	61.1
Wholesale	93.6	91.0	88.3	81.8
Manufacturing	65.7	61.0	61.3	56.0

*Central cities as percentage of corresponding metropolitan area

Source: The Changing Economic Function of the Central City: Raymond Vernon, Appendix - Table 2, 3, 4.

TABLE C-VI

Distribution of Manufacturing and Non-Manufacturing Jobs

Sectors and Access Zones: 1950

1950	MFG. Number	% of SMA	Non-MFG Number	% of SMA
Sector[2] I	162.6[1]	32.0	164.5	19.8
II	127.1	24.6	120.4	14.5
III	27.6	5.3	101.5	12.2
IV	84.3	16.3	28.2	3.4
V	8.1	1.6	10.2	1.3
VI	41.6	8.0	53.8	6.5
VII	10.7	2.0	12.2	1.7
Access Zone (Auto)				
0-15 min's.	192.4	37.2	407.1	49.0
15-30 min's.	171.5	33.1	256.8	30.9
30-45 min's.	55.9	10.8	67.9	8.18
45-60 min's.	46.1	8.9	43.3	5.2
60 plus	51.6	10.0	45.4	5.5

Source: Urban Traffic and Transportation Board's Technical Memorandum #3, Table 21.

1. Figures in thousands

2. The central business district was not included in computing figures.

TABLE C-VII

X Distribution of Manufacturing and Non-Manufacturing Jobs Within Sector III and VI: 1950

Sector III

	MFG. AUTO	MFG. % TOTAL PSMA	MFG. MASS TRANSIT	MFG. % TOTAL PSMA	NON-MFG. AUTO	NON-MFG. % TOTAL PSMA	NON-MFG. MASS TRANSIT	NON-MFG. % TOTAL PSMA.
ACCESS ZONE								
0-15	-	-	4,200 [1.]	-	-	-	31,500	3.8
15-30	13,300	2.7	12,200c	2.5	58,200	7.0	52,300	6.9
30-45	3,100	-	1,300	-	25,600	3.1	1,900	-
45-60	1,300	-	6,100	1.2	1,900	-	8,600	-
60 plus	9,300	1.8	3,200	-	17,500	2.1	9,900	1.2

SECTOR VI.

0-15	-	-	-	-	-	-	-	-
15-30	39,400	7.5	37,000	7.1	51,000	.6.1	42,300	5.0
30-45	1,800	-	2,200	-	3,500	-	8,700	1.1
45-60	300	-	1,800	-	300	-	2,400	-
60 plus	100	-	400	-	10	.-	410	-

1. No calculations made where workers were less than 1 % of PSMA total.

Source: Urban Traffic and Transportation Board, Technical Memorandum No. 3, T ble 22.

TABLE C-VIII

Number of Residences and Jobs by Planning Analysis Areas

	Area	Number of Residences	Number of Jobs	Number of Residents Who Work in Area	Percentage of Residents Who Work Out of Area	Number of Workers Who Come From Outside	Percentage of Work Force Which Comes from Outside
A.	Central	19,373	163,693	14,400	26	149,293	91
B.	South	52,256	59,672	23,212	56	36,460	61
C.	Southwest	32,982	25,963	2,148	65	17,817	69
D.	West	61,553	46,547	18,996	72	29,551	64
E.	Lower North	58,702	36,191	19,526	67	36,665	65
F.	Upper North	37,576	38,742	6,793	82	21,949	76
G.	Kensington	24,887	32,240	3,560	66	23,660	74
H.	Roxborough-Manayunk	9,283	6,037	2,165	78	3,872	84
I.	Germantown-Chestnut Hill	18,867	17,483	4,913	74	12,570	73
J.	Olney-Oak Lane	31,447	12,342	5,864	82	6,478	53
K.	Near Northeast	55,598	51,194	25,747	61	25,447	50
L.	Far Northeast	9,288	17,817	2,318	75	15,499	87
	Lower Delaware County	84,558	50,682	44,505	47	6,177	12
	Upper Delaware County	24,356	12,005	5,902	77	6,103	51
	Lower Montgomery County	65,956	39,221	20,001	70	19,220	49
	Upper Montgomery County	49,399	43,177	33,778	32	9,399	22
	Chester County	34,930	36,482	28,560	18	7,922	22
	Bucks County	53,997	33,231	27,330	49	5,901	18
	Burlington County	32,553	27,867	23,162	29	4,715	17
	Camden City	33,528	41,977	19,822	41	22,155	53
	Rest of Camden County	61,466	24,292	18,361	69	5,931	24
	Gloucester County	24,039	16,253	14,476	40	1,777	11
	TOTAL	576,794	806,650	374,529	57	432,121	54

Source: U.S. Bureau of the Census, 1956 National Housing Inventory, Philadelphia Supplement

TABLE C-IX

Location of Employment by Area of Residence:
Philadelphia Standard Metropolitan Area -
All Employed Heads of Households

	Area of Residence	Total	Central A	South B	South-west C	West D	Lower North E	Upper North F	Kensing-ton G	Roxbor-ough-Manayunk H	German-town Chestnut Hill(na) I
A.	Central	19,373	14,401	268	414	1,400	771	280	3,224	0	28
B.	South	52,256	13,055	23,214	1,640	1,400	2,686	414	115	230	64
C.	Southwest	22,981	3,868	3,325	8,147	363	897	592	598	0	
D.	West	61,552	19,883	4,972	4,536	16,997	2,755	2,277	299	158	30
E.	Lower North	58,702	12,485	4,317	983	2,818	19,527	2,784	988	1,241	
F.	Upper North	37,576	9,218	1,311	983	1,056	7,497	5,794	2,809	703	
G.	Kensington	24,809	4,108	1,782	0	898	2,494	1,533	3,285	299	
H.	Roxborough-Manayunk	9,283	636	361	341	0	598	1,526	8,550	2,165	
I.	Grmtn-Chestnut Hill	18,867	4,436	1,142	897	897	1,234	598	219	598	
J.	Olney Oak Lane	31,447	5,682	2,197	939	1,827	4,395	1,724	748	301	
K.	Near Northeast	85,598	11,701	1,386	622	3,078	3,501	2,927	2,219	0	
L.	Far Northeast	9,288	3,002	978	0	144	676	76	4,575	0	
	Lower Delaware Co.	84,558	13,761	4,378	4,324	6,682	1,530	0	626	0	
	Upper Delaware Co.	24,386	4,880	3,585	713	2,061	0	0	0	0	
	Lower Montgomery Co.	65,996	20,382	656	340	1,215	2,160	2,927	981	159	
	Upper Montgomery Co.	49,399	1,753	0	0	0	1,125	385	108	0	
	Chester County	34,930	1,622	0	0	404	230	0	0	0	
	Bucks County	53,997	2,782	149	0	0	470	1,613	1069	184	
	Burlington County	32,584	1,917	146	0	565	163	406	817	0	
	Garden City	38,628	2,017	1,169	0	182	414	1,154	927	0	
	Rest of Camden Co.	57,166	10,952	3,776	385	1,729	2,200	156	503	0	
	Gloucester County	24,089	1,103	1,158	162	165	180	0	623	0	
	TOTAL	872,570	165,695	59,676	25,966	46,350	56,194	28,744	32,242	6,039	

Source: U.S. Bureau of the Census, 1956 National Housing Inventory, Philadelphia Supplement

Location of Employment

Olney Oak Lane	Near North-east	Far North-east	Lower Del. County	Upper Del. County	Lower Mont. County	Upper Mont. County	Chester County	Bucks County	Burling-ton County	Garden City	Rest of Camden County	Glou-cester County	Outside P.S.M.A.
J	K	L											
0	154	0	299	299	257	0	0	0	0	163	257	0	0
462	3,398	414	59	529	116	115	597	0	43	1,012	0	0	732
0	299	298	0	897	0	0	299	0	0	0	0	0	741
299	1,083	2,185	116	299	713	598	1,127	299	0	534	299	299	1,173
352	3,307	2,886	115	414	1,336	299	299	414	0	529	0	0	846
33	2,034	1,061	299	299	683	0	0	0	0	0	299	0	598
23	3,025	952	0	0	327	0	0	0	0	0	0	0	713
0	295	593	0	295	290	113	0	0	107	466	0	0	0
632	45	613	0	290	32	0	0	0	0	0	0	0	0
5,864	1,712	134	43	0	290	899	0	80	34	348	0	0	482
863	25,748	3,419	403	259	552	0	598	2,278	0	120	32	0	2,126
106	810	2,318	0	0	0	0	115	55	0	41	0	0	48
0	1,652	96	44,507	1,803	0	0	1,572	0	0	385	0	92	2,924
331	82	0	2,336	5,002	2,247	0	511	0	0	0	0	0	1,346
2,229	1,932	500	770	385	20,002	4,326	542	1,092	0	90	0	0	1,882
98	0	35	88	0	3,574	33,781	1,263	0	0	51	0	0	856
0	0	0	009	404	952	699	28,562	0	0	0	0	0	1,153
298	3,358	1,819	406	0	2,016	2,352	0	27,332	320	149	148	932	9,274
340	192	139	0	0	0	0	0	163	23,154	1,334	1,547	583	1,622
0	399	149	0	152	0	0	0	385	2,499	19,833	2,281		1,252
0	383	385	0	0	516	0	0	534	1,304	14,431	18,362	14,477	428
35	570	0	340	0	0	0	0	0	383	2,502	1,856		1,371
NA	51,197	17,810	50,685	12,006	39,228	43,131	38,454	33,333	NA	NA	283,2924	16,222	22,482

TABLE CXX

Percentage Distribution of Residences and Job Locations of High and Low Income Families and Household Heads, P.S.M.A. (Five Largest Districts Only)

Income of Family by Residential Area

Under $4,000		Over $8,000	
Lower North	15.4	Lower Montgomery County	16.9
West	10.8	Lower Delaware County	12.6
South	9.4	Rest of Camden County	10.4
Lower Delaware	7.5	Near Northeast	5.3
Upper North	6.1	Bucks County	5.9
Total Largest Five	49.6		52. 1

Income of Household Heads by Location of Job

Under $4,000		Over $8,000	
Central	10.1	Central	28.3
Lower North	10.4	Lower Delaware County	8.6
South	8.2	Lower Montgomery County	7.2
West	5.9	Camden City	6.8
Lower Delaware County	5.6	Near Northeast	6.8
Total Largest Five	49.2		57.7

Source: U.S. Bureau of the Census, 1956 National Housing Inventory, Philadelphia Supplement.

TABLE C-XII

Median Journey to Work Time by Occupation of Household Head (in minutes) December 1956

Occupational Status	P.S.M.A.	Phila. Suburbs	Phila. All	Phila. White	Phila. Non-White
Technical, Professional	28	30	23	23	14
Proprietors, Managers	23	27	20	20	9
Clerical	31	22	35	35	56
Sales	29	27	32	31	41
Craftsmen, Foremen	28	25	38	33	37
Operators	37	22	30	27	36
Service Workers	24	17	27	22	32
Other Labor	28	18	38	33	42
All Households	27	25	30	29	35

Source: U.S. Bureau of the Census, 1956 National Housing Inventory, Philadelphia Supplement.

TABLE ~~XI~~XII

Percentage Distribution of Time of the Journey to Work for White and Non-White Workers Within Philadelphia

(for selected residential areas of Philadelphia)

Residential Area	Under 20 mins.		20-40 mins.		40-50 mins.		Over 1 Hour		Total	
	White	Non-White	White	Non-White	White	Non-White	White	Non-White	White	Non-White
Central	48	33	35	48	12	13	5	8	100	100
South	37	37	41	42	13	10	9	11	100	100
Southwest	35	23	30	50	26	4	9	23	100	100
West	35	16	45	48	15	18	5	19	100	100
Lower North	46	19	28	42	12	21	14	18	100	100
Upper North	44	22	38	52	14	18	4	8	100	100
Germantown-Chestnut Hill	32	0	36	56	19	16	13	28	100	100

Source: U.S. Bureau of the Census, 1956 National Housing Inventory, Philadelphia Supplement.

TABLE C-XIII

NUMBER OF PERSON-TRIPS ENTERING THE CENTRAL CITY BY PURPOSE OF TRIP AND DISTANCE OF RESIDENCE FROM CITY HALL

Average Weekday, June to November, 1947. Internal Trips Only.

PURPOSE OF TRIP	DISTANCE OF RESIDENCE FROM CITY HALL (IN MILES) 0-1.0	1.1-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	Over 10	Total Reporting	No Answer	Total	Per Cent of Total
	NUMBER OF TRIPS										
Work	5,240	30,600	39,290	64,000	49,190	22,890	1,020	212,230	100	212,330	45.3
Business	1,340	5,360	8,040	9,050	4,560	2,660	70	31,080	20	31,100	6.6
Shopping	1,630	9.240	16,150	25,340	22,070	8,580	680	83,690	40	83,730	17.8
Social-Recreation	1,000	5,800	7,740	12,330	7,840	3,850	300	38,860	10	38,870	8.3
Change Travel Mode	2,820	13,550	13,140	24,000	18,640	7,360	550	80,060	10	80,070	17.1
Other	11,220	2,510	2,240	3,120	2,880	1,120	40	23,130		23,130	4.9
TOTAL TRIPS	23,250	67,060	86,600	137,840	105,180	46,460	2,660	469,050	180	469,230	100.0
	PERCENTAGE DISTRIBUTION										
Work	2.5	14.4	18.5	30.2	23.2	10.8	0.5	100.0			
Business	4.3	17.2	25.9	29.1	14.7	8.6	0.2	100.0			
Shopping	1.9	11.0	19.3	30.3	26.4	10.3	0.8	100.0			
Social-Recreation	2.6	14.9	19.9	31.7	20.2	9.9	0.8	100.0			
Change Travel Mode	3.5	16.9	16.4	30.0	23.3	9.2	0.7	100.0			
Other	48.5	10.9	9.7	13.5	12.5	4.8	0.2	100.0			
TOTAL TRIPS	5.0	14.3	18.5	29.4	22.4	9.9	0.6	100.0			

Source: Philadelphia-Camden Area Traffic Survey, 1947

III Socio-Economic Variables.

1. Distribution of the variable at a fixed moment in time: 1950.

a. Analysis of the Index of Similarity for Sectors III and VI contained in Appendix C-2 shows that there are meaningful distinctions between the two sectors. First, Sector III, has a higher concentration of professionals, clericals, and children close into the C.B.D. Second, professionals and clericals in Sector III decline further away from the CBD then rise in Chester PAA 2, in contrast to Sector VI where they fall constantly. Third, the proportion of children under 14 is higher in Sector VI than in Sector III further out in the region.

There are also striking similarities between these two sectors: Sector III has almost as high a concentration of craftsman, operatives, and laborers as Sector VI; in both the proportion of Negroes declines near the CBD and rises further out in the region; in both the number of laborers steadily increases away from the C.B.D.; in both there is some resemblance as far as professionals and clericals are concerned in that the highest concentration in Sector VI is closer into the CBD; and, finally, in both, there is a lower proportion of many of the variables than there is throughout the PSMA.

b. Chart C-12 indicates the distribution of high and low income census tracts, based upon median incomes as defined in the 1950 census. The median income for the city of Philadelphia for that year was $2,869.00.[15] High income tracts were defined as those in which the median exceeded $4,000.00; low income as those in which it was under $2,000.00 These two figures were selected after attempting to utilize

the figure of $5,000.00 for high income and $1,000.00 for low income. So few tracts were defined by these boundaries that no pattern could be established.

The pattern illustrated, however, manages to rather effectively related the rental and value pattern established earlier in Charts IV and V. When all these charts are compared with each other, the distribution of residential space according to rents, values, and incomes contains elements of both concentric rings and sectors.

2. Changing distribution of the variables through time.

Before discussing the shifting pattern of these variables, the theoretical problem posed by both Hoyt and Firey in reference to the role of culture and class in determining the use of residential space must be related to the data. The clearest information available concerning both these variables is about the movement of upper class residential areas since Colonial Times.[16] Their movement can be utilized not only to test Hoyt's basic hypothesis concerning the pull of these classes, but also to test the role of symbolism: some areas of Philadelphia should have the same symbolical meaning attached to them that Beacon Hill has attached to it.

The location of these upper class areas has already been established for 1940. These locations were the product of generations of shifting westward. Chart C-13A shows William Penn's original city. Philadelphia's Colonial upper classes lived adjacent to Independence Hall in the area known as Society Hill. Their summer estates lay largely to the west, along the banks of the Schuykill river, in what is now Fairmount Park.

The center of the city slowly moved westward in the early part of the 19th century and, shortly after the Civil War, the upper class community followed the trend, settling in the area bounded by Pine Street to the south, Market to the north, Broad to the east, and the Schuykill River to the west. The center of this neighborhood was Rittenhouse Square. "During the second half of the 19th century, Rittenhouse Square was surrounded by the mansions of Philadelphia's aristocracy."[17] The first house upon the Square was constructed in the 1840's and from that date until the early part of the 20th century, it and the areas around it were "the neighborhood," of Philadelphia.

The suburban development of upper class communities did not begin until the building of the railroads in the 1830's. The first of these suburbs to attract attention was Germantown. By the 1890's it had become a fashionable center for Philadelphia society. The "Main Line" was also developed during this period. In the 1860's double tracks were built and the area became a fashionable site for summer residence. Chestnut Hill was developed at a slightly later date. Planned by a group of Philadelphia merchants, it began its most rapid development in the 1880's. One wealthy entrepreneur helped in the construction of the railroad and built many of the inns, Churches, and other institutions in the area. The Pennlyn-Whitemarsh neighborhood to the north is an extension of Chestnut Hill with slight variations in social character, while Jenkintown to the east no longer possesses its upper class connotations.

It was to these neighborhoods to the west and north (Swarthmore to the south and west never attracted as many upper class individuals)

that the residents of the Rittenhouse Square area moved after World War One. It was a true movement in terms of the sector analysis. It followed the turnpikes at first, then shifted to the railroads. It was homogenous in terms of class.

The westward movement of these upper classes groups was followed by those defined as the elite. For a time, interestingly enough, there was a shift to the north along Broad Street for some of the elite as well as a few families listed in the Register. However, this movement degenerated and such families continued to move westward into the area of West Philadelphia.

In contrast to this abortive move to the north, south Philadelphia has never been a fashionable address. This segregation of eastern and southern areas from those to the west, north, and south west tends to confirm the sectors hypothesized originally, as far as Hoyt's criterion of class is concerned.

Chart C-13B would indicate that his definition of class and "leaders of the community" tends to ignore the pluralistic nature of modern society. This Chart shows the development of the Jewish upper class neighborhoods in Philadelphia. This group has possessed a particular viability in the metropolitan area, having its own mores, folkways, and integrity. The leaders of the community have tended to group together, first to the east of Broad Street, prior to 1890, then to the west of Broad Street between 1890-1920, and, finally, continuing to move northward after 1920 but out into the suburbs, around Jenkintown.

Though no specific information could be obtained concerning the movement of intermediate rental areas for Jewish persons, data was

available for those of Russian Birth. According to the study under consideration, the majority of the Jewish people in Philadelphia were of Russian origin.[18] Therefore, it can probably be assumed that the movements of those born in Russia roughly indicates that of the Jewish people. Chart C-14 shows that they have been shifting to the north, out of the "ghetto" areas originally in the south of the city. C-4, C-5, C-12 shows that, generally, the areas inhabited by these mobile Russians were intermediate rental, value, and income areas. On the basis of this evidence there seems to be a movement of the intermediate Jewish area, related to the movement of the leaders of the particular community. This movement is largely to the north.

The "ghettos" originally inhabited by this ethnic group - and the Italian as well[19] - do not seem to possess the symbolism which Firey posits for such groups, particularly the Italians in the North End. There is a clear pattern of shifting out from such areas - and, since the data here only involves those born outside the United States, it can be assumed that the pattern would be even stronger if data concerning the second generation were included.

Society Hill has also lacked the stability of Beacon Hill. By 1956 it had become a slum area, ripe for activity under the urban renewal program. Even the symbolical force of one of the most important of America's historical shrines did not spread to the adjacent residential area. Rittenhouse Square has also changed its uses in this era. The old Victorian mansions have either been replaced by apartments and apartment hotels or utilized for various institutional uses.

The stable areas have remained outside the central city, particularly in the suburbs and Chestnut ill. Such stability exists for many reasons but among the more important Baltzell has indicated are the scale at which the estates in Chestnut Hill were originally built. They were laid out at a density which could survive the 20th century. ¶ Thus these original estates remained intact throughout the years, even when lack of gardeners and servents caused the break-up of large estates elsewhere.[20] " Moreover, this area also profited from the fact that many of its homes were owned by one estatewith the policy of renting to the"impecunious genteel.[21] "

Chart C-15 - zoning in Pennsylvania Counties - indicates another reason that such communities have suruvived. They have preserved them - selves via zoning ordinances.

Besides ethnic and class influences upon the development of residential neighborhoods, another factor of particular importance is the racial variable. As indicated in Table C-XIV the central city gained approximately 150,000 Negroes between 1950 and 1960. In this same period it lost over 100,000 of its total population. Consequently ; it can be assumed that the central city lost approximately 250,000 whites while gaining 150,000 Negroes.

In contrast to many other urban areas, thes Negroes are not lumped together into one mass-like ghetto. Instead, they are spread out in three main areas, indicated on Chart C-16. These areas contained over 80% of the Negro population in 1950. " However, there were Negroes in all fifty-two wards of the city and in only five wards were there lessthan 100 non-whites.[22.] ¶

There is a constant expansion of these areas, however, under the pressure of the in-migrant population which often purchases instead of renting: by 1956 an estimated 44% of the Negroes owned their homes. A crescent study of the areas of transition[23] has indicated that some white buyers are buying into a transitional or mixed neighborhood. For those who do so, the problem of scale is all important. Few whites will ever buy directly next door to a negro; more will buy in the same block; and even more will buy in an adjacent block. Consequently, though the number of such white purchases is small,[24] it indicates a trend which should not be ignored. The development of Negro neighborhoods is not totally a function of the process of invasion-succession. Varying degrees of heterogeneity are developed in the process, depending upon the scale of analysis.

Other socio-economic variables hypothesized as playing a role in the redistribution of residential space are the age structure of the family or household and its income. For the central business district, a 1957 survey indicated that 94% of its households had no children - as balanced against 50% such households in the entire PSMA.[25] For the central city itself, only 36.2% of its households had children under six years while 56.1% of suburban households had children this age. 81% of suburban households were childless couples, couples with pre-school children, and children under 18 while only 61% of the city households contained these categories.[26]

Though no specific information could be obtained concerning the pattern of rising incomes in Philadelphia, it can be assumed that the area has participated in the rise in median incomes which occurred between 1950 and 1956: the income of non-farm families rose from$3,497.00 to $5,061.00 or by 45% in this period.

TABLE C-XIV

Changes in Negro Population, Philadelphia Standard Metropolitan Area, 1950-1960

	PSMA	Central City	7 Counties
1950	484.6*	379.0	105.6
1960	671.3	529.2	172.1

*Figures in thousands

Source: Philadelphia Housing Association
Commission on Housing Relations: Philadelphia's Negro Population, p. 26.

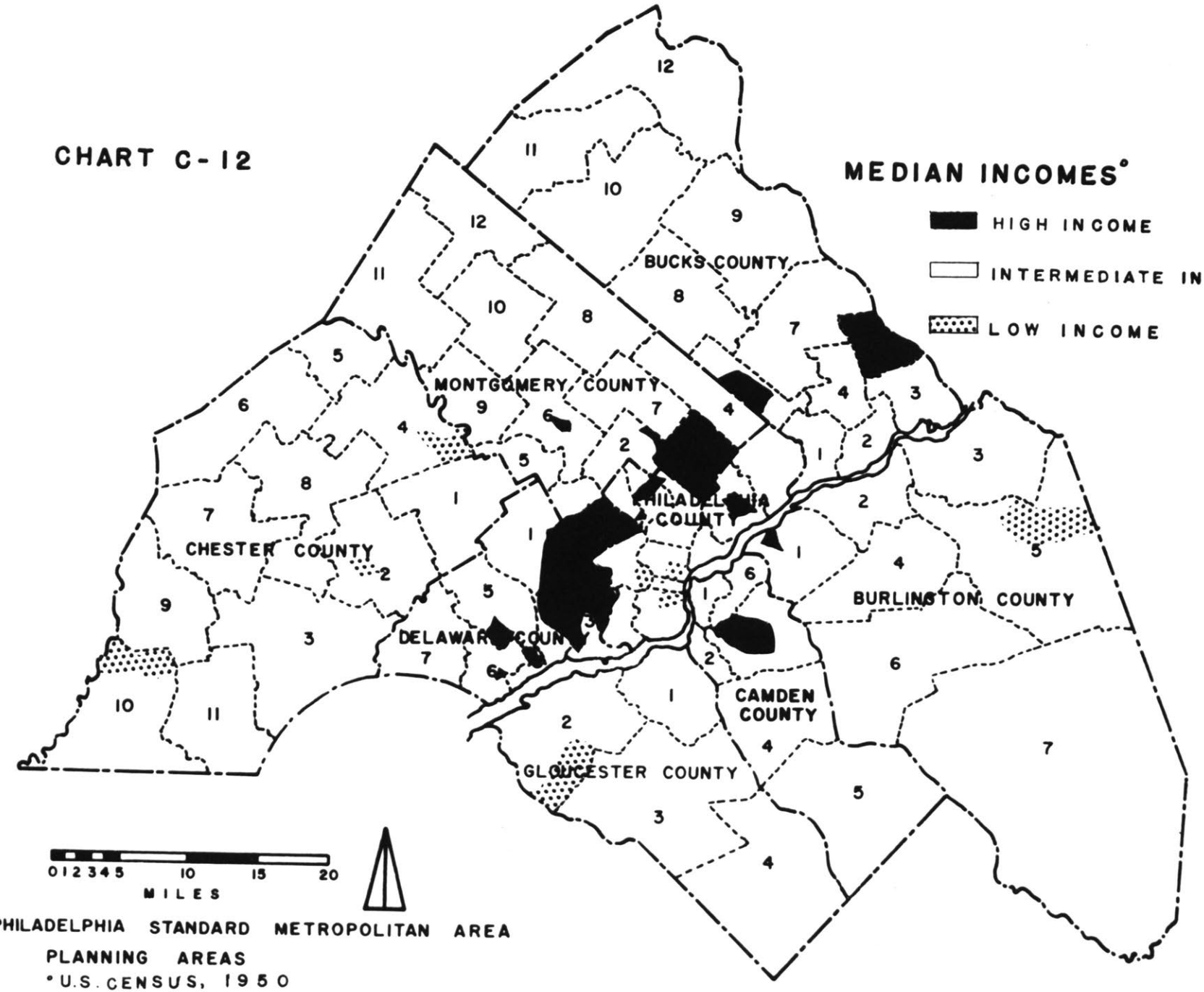


CHART C-12
MEDIAN INCOMES°
HIGH INCOME
INTERMEDIATE INCOME
LOW INCOME
BUCKS COUNTY
MONTGOMERY COUNTY
CHESTER COUNTY
DELAWARE COUNTY
PHILADELPHIA COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS
°U.S. CENSUS, 1950

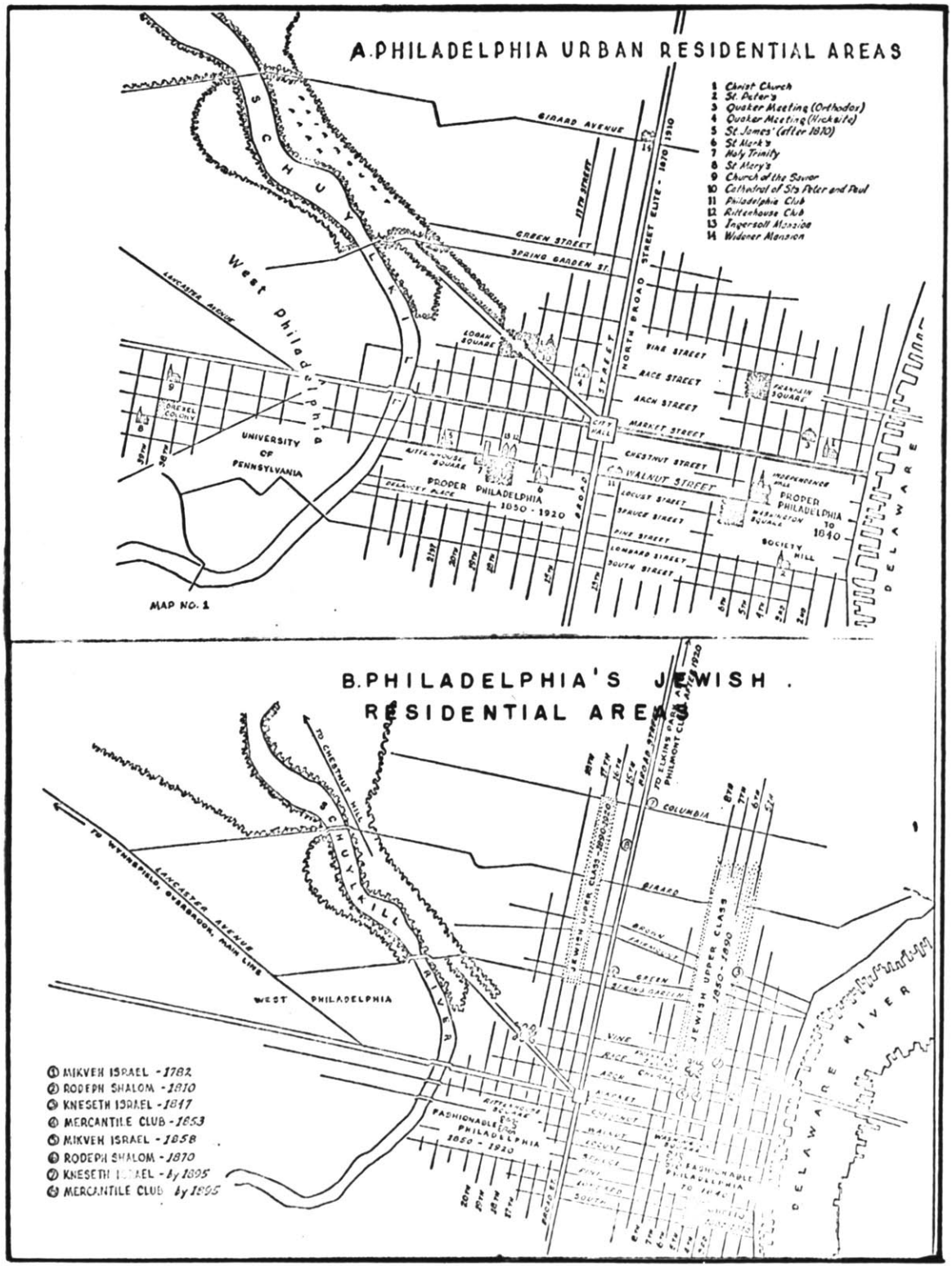
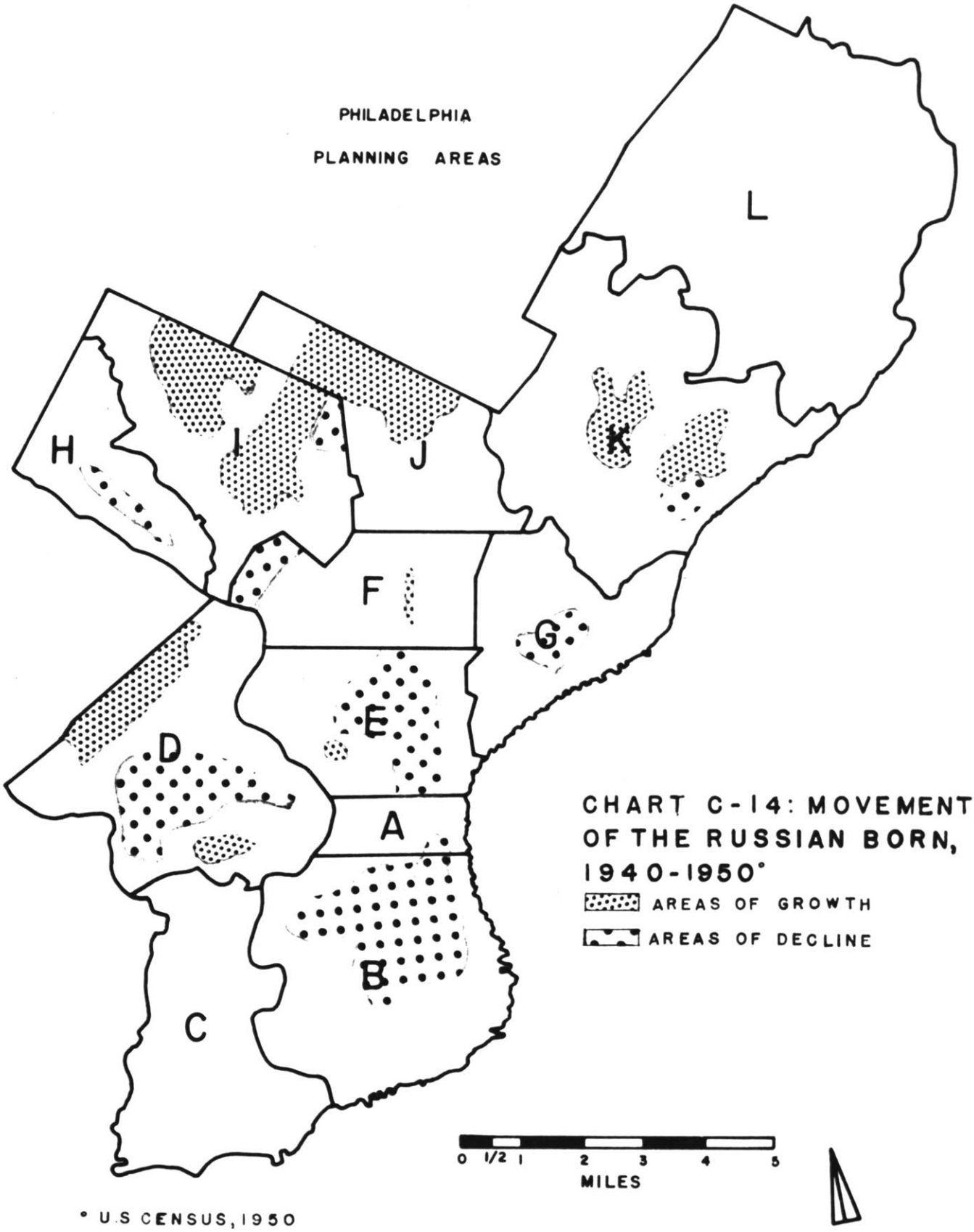


CHART C-13

SOURCE: PHILADELPHIA GENTLEMAN


PHILADELPHIA
PLANNING AREAS
L
K
H
I
J
F
G
E
D
A
B
C
CHART C-14: MOVEMENT OF THE RUSSIAN BORN, 1940-1950*
AREAS OF GROWTH
AREAS OF DECLINE
0 1/2 1 2 3 4 5
MILES
* U.S CENSUS, 1950

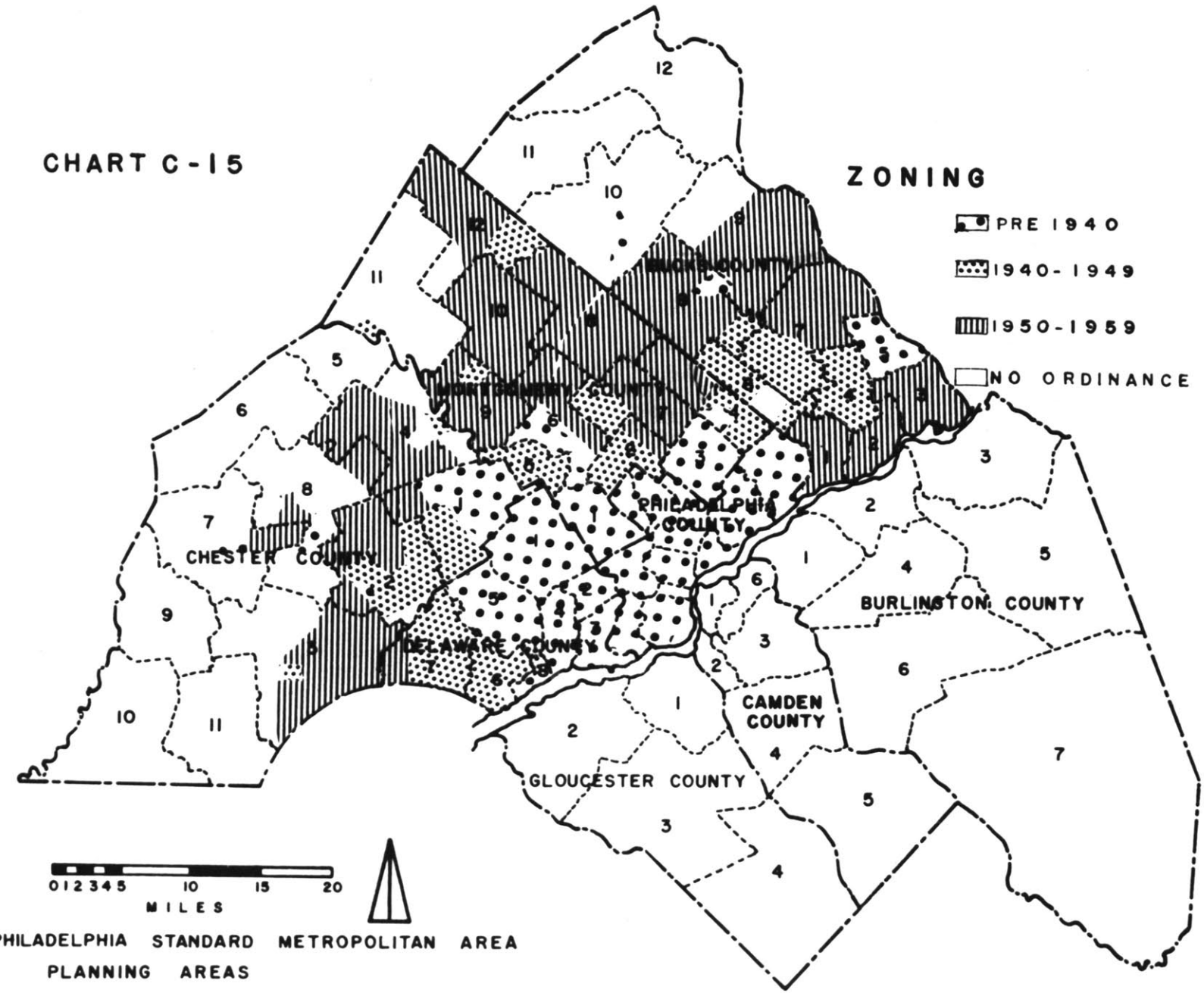
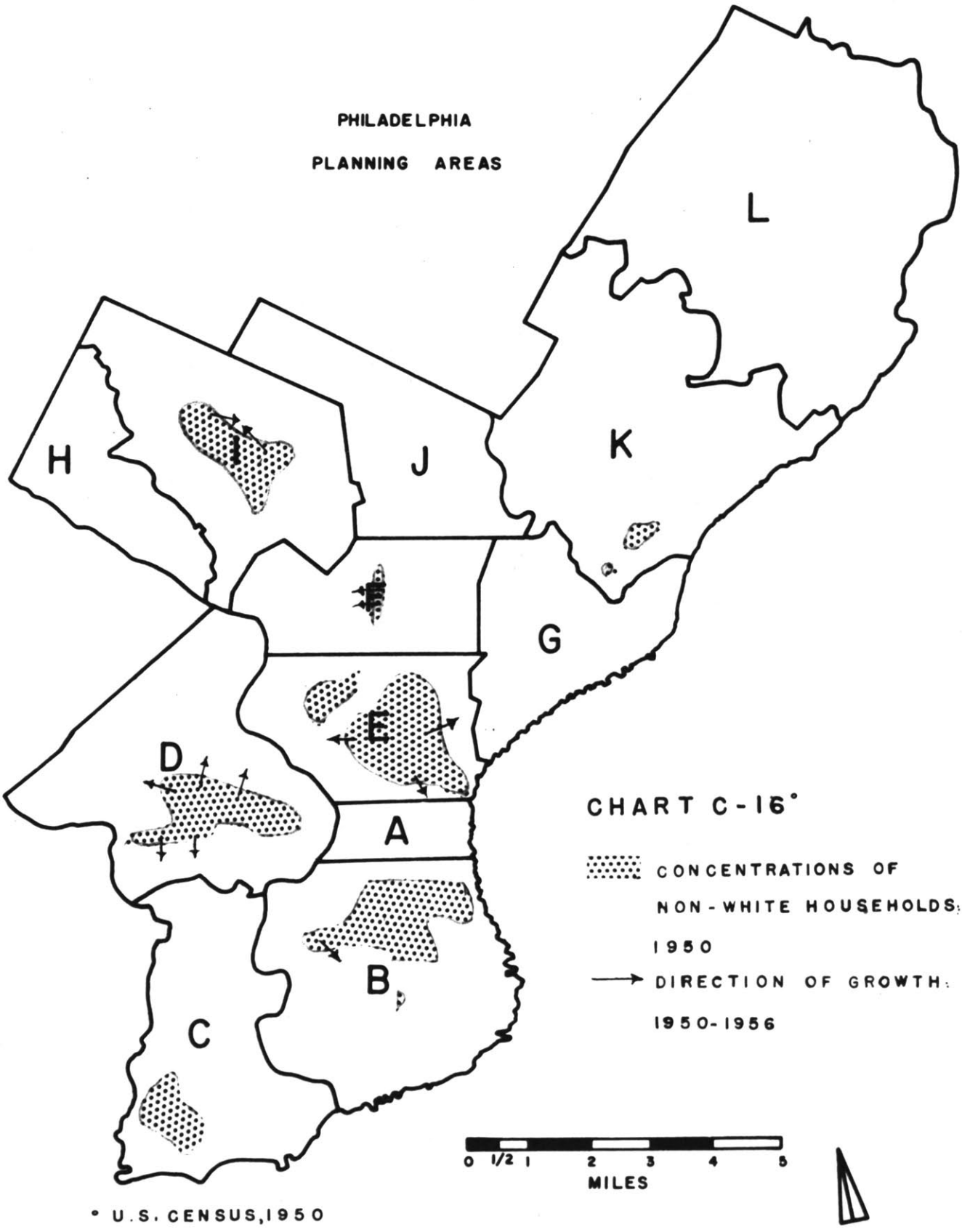


CHART C-15
ZONING
PRE 1940
1940-1949
1950-1959
NO ORDINANCE
PHILADELPHIA COUNTY
CHESTER COUNTY
DELAWARE COUNTY
BURLINGTON COUNTY
CAMDEN COUNTY
GLOUCESTER COUNTY
0 1 2 3 4 5 10 15 20
MILES
PHILADELPHIA STANDARD METROPOLITAN AREA
PLANNING AREAS


PHILADELPHIA
PLANNING AREAS
L
K
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C
CHART C-16*
CONCENTRATIONS OF NON-WHITE HOUSEHOLDS: 1950
DIRECTION OF GROWTH: 1950-1956
0 1/2 1 2 3 4 5
MILES
* U.S. CENSUS, 1950

IV. Physical Environment

1. Land

The variables to be discussed under land are topography, amount of vacant land, and densities. The basic topographical element in the region is the Delaware River which divides the PSMA into two sections. Construction of a purely concentric ring pattern does not indicate the importance of this barrier as an impediment to movement between the two portions of the PSMA. Much of the differentiation between the New Jersey and the Pennsylvania Counties is based upon this physical factor.

Another topographical element of much importance tends to bear out one of Hoyt's major hypothesis: the movement of high rental neighborhoods toward higher land. Not only is the land to the west of the Delaware generally higher than that in New Jersey, but the highest ridges of all occur in Sector III, particularly in the area of Paoli and the Main Line.

Existing densities - as indicated in Table C-XV - tend to reflect the distinction between the New Jersey and the Pennsylvania Counties, as New Jersey densities are lower than the Pennsylvania. The Table also shows that, as far as spatial distance is concerned, densities can be expressed in terms of concentricity with some degree of accuracy. For time distance, however, it is unlikely that density would be so concentric, given the skewed nature of time distance to the central core.

As indicated in Table C-XVI, densities for new construction and amount of vacant land available for new construction do not directly

reflect a concentric ring distribution. Camden PAA 1 and 6 lie in a different zone than Delaware PAA 2 but their densities of new construction are the same. Delaware PAA 2 and Montgomery PAA 1 are in the same access zone but their densities for new construction do not resemble each other. A similar differentiation exists for amount of vacant land available for new construction.

2. Housing Supply

a. Distribution of the variable at a fixed moment in time: 1950.

The Index of Similarity constructed for age and type of housing indicates little that is unexpected: both older units and multi-family units are concentrated near the core. There is also a rise in such units in Chester PAA 2 - where there is a smaller node of higher density development. In general at the county scale, the U.S. Census of Housing has, once more, indicated the expected: concentration of older and more dilapidated units near the center, increased number of single family units out from the center. There are greater number of older units in Delaware County. The Census data also points out that Philadelphia has developed a tradition of row housing and of home owhership.

b. Changing pattern of distribution of the variable.

Table C- XVII indicates new residential construction in the PSMA from 1946-1955. The level of construction tends to confirm the insights already developed: the growth of the Pennsylvania counties as contrasted with the New Jersey Counties, that growth occuring in Montgomery and Delaware Counties in the earlier part of the period, then shifting to Bucks County. Though no data is available concerning the

the type of construction in these areas, discussion with members of the Urban Land Institute indicated that it was largely single family.

Such construction is certainly indicated by Table C-XVIII. Between 1946 and 1956 multiple dwellings accounted for less than 10% of the total construction occurring in Philadelphia while single family accounted for over 70%. Moreover, as Table C-XIX indicates much of this new construction of single family houses lay in the northern and northwestern portions of the city (Area A and Area B are approximately the same as PAA K and L) while multi-family was in the rest of the city.

The role that public construction has played in this new development is indicated on both Tables C-XVIII and C-XX. Between 1946 and 1956 public construction accounted for less than 10% of all dwelling units constructed in the central city and in these same base years only 7,986 public housing units were constructed in the entire SMA as contrasted to 288, 890 total units.

In the base years under consideration, urban renewal activities were still playing a relatively minor part in the provision of housing. By December, 1959, only five residential projects had been completed, involving 1333 units.[27] These, of course, are but a beginning to the renewal effort in the central city. Existing plans involve the construction of over 15,000 units within the next 10 years. By 1960 only four conservation areas had been delineated totaling 518.6 of the cities 38,871 residential acres.[28]

Of those units constructed by 1959 the majority were multi-family. However, once the Eastwick project is effectuated, this emphasis will

change to row type houses. (Over 12,000 of the 15,000 units mentioned above will be in Eastwick.)

The price of this housing - constructed by private investors - is indicated on Table C-XXI and C-XXII. As can be observed, the price of housing is rising steadily and, even more important, rental housing is being constructed for the upper income groups.

In summary, in terms of new construction, the central city has been receiving a decreasing share of the total - 48% in 1946 and 20% in 1956, the bulk of all this construction has been in single family residences with Delaware, Montgomery, and Bucks Counties receiving the greatest percentages. The bulk of new construction in the central city has occurred to the north in those PAA's having vacant land particularly, L and K in the central city. Both public housing and urban renewal have played a relatively minor role in the development of the central city and the suburbs by new construction.

New construction is but a part of the total change in the housing supply however. Another pattern concerns conversions, mergers, demolitions, and withdrawals, and vacancy rates. Tables C-XXIII and C-XXIV illustrate the role of the first three in both the central city and the metropolitan area. As indicated in footnote 2 on Table C-XXIII the 1956 figure for conversions in the city must be disregarded; it includes conversions discovered when an intensified housing inspection program was begun. From 1950 to 1955 there has been a consistent decline in the number of conversions and for 1954 and 1955 a withdrawal of units from the supply. For 1960 there were only 476 conversions recorded in the

entire city.[29] Consequently, conversions have been playing a declining role in the housing supply in Philadelphia. Table C-XXIV indicates this in another fashion: there have been more demolitions and withdrawals than mergersconversions. Those mergers and conversions which have occurred have been largely for renters. Conversions have predominated in 2-4 family and five family and over structures while mergers have occurred in 1 family structures.

Concerning the last of the variables - the vacancy rate - Table C-XXV indicates that there has been a rise in the vacancy rate since 1950, particularly in those units with low rentals. This trend is confirmed by recent figures released by the Department of Inspections and Liscenses for the city: at the end of 1960 the vacancy rate for "slum areas" in the city exceeded 20%.[30]

Turning from this scale of analysis to smaller scales, Table C-XXVI indicates even more strongly how new construction has concentrated in Sector I. Again, access zones show a different pattern, showing how new construction has centered in the 15-30 and 30-45 minute zones.

Charts C-17 and C-18 were developed to discern how housing and population changes are related at the scale of the census tract. They show the relation between conversions, demolition, and new construction to areas of growth and decline in population in the central city. C-17 indicates areas where population declined while the C-18 indicates those where population has grown. Changes in the housing supply, related to these areas has been summarized in terms of 8 processes: demolition,

conversion, new construction, and combinations of each of these.

By examining these Charts it can be determined that decline in population is associated with all processes but, particularly, with those of conversion and conversion-demolition. Growth in population is also related to all processes but, particularly, those of new construction and conversion-new construction. Growth and decline, consequently - at this small scale of the census tract - cannot clearly be defined in terms of a concentric ring or access zone definition. There is a belt of conversions and conversions-demolitions - but this belt is not associated with any increase in population. Instead, both growth and decline occur relative to this belt. It is also important to note that growth by conversions and conversion-demolitions is particularly associated with those areas containing the highest percentage of non-whites.

At the smallest possible scale of the block, Chart C-19 shows the average value of housing by blocks for a selected area to the north of the CBD, near Chestnut Hill. Values have been divided into five categories: the lowest under $15,000.00 and the highest over $30,000.00. Here, the smooth pattern discerned at the level of the census tract becomes blurred. Though the lower value houses are generally congregated as are the higher value, there is no longer the same consistency. Subtleties are discerned which the census tract denies.

TABLE C-XV

Area within 25 miles from Philadelphia City Hall

Density by distance zones persons per acre for Philadelphia, balance of Pennsylvania, and area in New Jersey, 1950.

	MILES FROM CITY HALL							
Area	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
Philadelphia	52.4	75.1	55.8	30.2	20.5	19.5	21.6	14.7
Pennsylvania	-	-	-	-	15.9	15.1	8.2	5.3
New Jersey	-	-	34.1	17.8	12.2	6.4	5.9	2.4
TOTAL Area	52.4	75.1	52.7	28.4	18.1	14.4	5.8	5.8

Area	8-9	9-10	10-12	12-14	14-16	16-18	18-25	0-25
Philadelphia	9.6	1.6	0.8	1.6	2.2	-	-	24.2
Pennsylvania	6.0	2.8	2.5	2.0	2.1	0.70	0.57	1.67
New Jersey	4.1	1.0	0.6	0.8	0.3	0.40	0.27	0.96
TOTAL Area	6.3	1.64	1.61	1.45	0.95	0.65	0.43	3.02

Source: Hans Blumenfeld, "The Tidal Wave of Metropolitan Expansion," American Institute of Planners, Vol. XX, Winter 1954.

TABLE C-XVI

Densities of New Construction and Amount of

Land Available for New Construction: 1950-1956.

	Density	Available Land as % of Total in P.A.A.
Sector III		
Phil.D.	n.a.	n.a.
Mont.1	1.3D.U.'s/Acre	42%
Del.1	1.5D.U.'s/Acre	46%
Del.2	5.5D.U.'s/Acre	.88%
Chester 1	1.5D.U.'s/Acre	69%
Chester 2	1.5D.U.'s/Acre	74%
Chester 4	1.5D.U.'s/Acre	57%
Chester 5	1.5D.U.'s/Acre	65.7%
Chester 6	1.5D.U.'s/Acre	65.7%
Chester 7	1.5D.U.'s/Acre	65.3%
Chester 8	1.5D.U.'s/Acre	65.3%
Chester 9	3.0D.U.s/Acre	n.a.
Sector VI		
Camden 1	5.5D.U.'s/Acre	17%
Camden 2	3.0D.U.'s/Acre	
Camden 3	3.0D.U.'s/Acre	57%
Camden 5	3.0D.U.'s/Acre	65%
Camden 6	5.5D.U.'s/Acre	17%
Burl. 6	1.5D.U.'s/Acre	83.5%
Burl. 7	1.5D.U.'s/Acre	7.9%

Source: W. B. Hansen: Residential Extension in a Metropolitan Region. An unpublished doctoral dissertation in planning at the University of Pennsylvania, 1961.

TABLE C-XVII

New Residential Construction, Philadelphia Standard Metropolitan Area, 1946-1955[1]

	Phila.	Del.	Mont.	Bucks	Chester	Burl.	Cam.	Glouc.	Met. Area Total
1946	6,310	2,340	1,330	700	390	580	1,080	440	13,170
1947	6,340	2,400	1,870	1,300	850	1,010	2,020	770	16,560
1948	5,200	6,440	2,500	1,500	1,710	1,800	2,720	1,040	22,910
1949	6,550	4,420	5,800	2,600	1,450	1,110	3,880	1,300	27,110
1950	12,310*	7,970*	5,360	2,700	1,120	1,400	3,800	1,150	35,810
TOTAL 1946-50	36,710	23,570	16,860	8,800	5,520	5,900	13,500	4,700	115,560
1951	6,610	4,320	3,600	3,330	900	1,550	2,700	950	23,960
1952	7,160	3,610	4,380	6,540	1,470	2,170	2,380	920	28,630
1953	7,480	3,730	4,00	6,450	1,580	1,980	2,870	1,150	29,240
1954	5,210	5,730	5,540	5,240	1,840	1,770	4,390*	1,680	31,400
1955	5,830	5,220	6,230*	7,500*	2,030*	3,350*	3,800	2,230*	36,190*
1956**	4,810	3,100	4,700	3,600	1,800	1,500	3,000	1,400	23,910
TOTAL 1951-56	37,100	25,710	28,450	32,660	9,620	12,320	19,140	8,330	173,330
TOTAL 1946-56	73,810	49,280	45,310	41,460	15,140	18,220	32,640	13,030	288,890

1. Figures are a composite of permits issued in permit issuing places plus actual starts in non-permit issuing places. Figures for Philadelphia were obtained from the Philadelphia Housing Association. Figures for the outlying counties are based on data obtained from the Bureau of Labor Statistics.

* Year of largest construction volume for the county for the ten-year period.

** Preliminary.

Taken from: Institute for Urban Affairs: Changes in the Housing Inventory, Univ. of Penn., June 1, 1957.

TABLE C-XVIII

Dwelling Units Put Under Permit
City of Philadelphia, 1946-1956[1]

	Private Construction						Public Construction	Total Construction	Total Multiple (Public & Private)[3]
	Single Family				Two Family	Multiple	Total Private			
	Row	Semi-Detached	De-tached	Total					
1946	NA[2]	NA	NA	3,860	500	170	4,530	1,780	6,310	1,950
1947	NA	NA	NA	3,970	2,170	200	6,340	0	6,340	200
1948	NA	NA	NA	3,790	960	450	5,200	0	5,200	450
1949	NA	NA	NA	4,740	410	1,400	6,550	0	6,550	1,400
1950	NA	NA	NA	9,340	490	2,480	12,310	0	12,310	2,480
Total 1946-50				25,700	4,530	4,700	34,930	1,780	36,710	6,480
1951	NA	NA	NA	5,670	440	280	6,390	220	6,610	500
1952	NA	NA	NA	5,200	430	180	5,810	1,350	7,160	1,530
1953	NA	NA	NA	3,670	550	1,040	5,260	2,220	7,480	3,260
1954	1,630	1,360	780	3,770	600	340	4,710	500	5,210	840
1955	1,190	2,630	1,210	5,040	490	300	5,830	0	5,830	300
1956	880	2,150	680	3,710	280	450	4,440	370	4,810	820
Total 1951-56				27,060	2,790	2,590	32,440	4,660	37,100	7,250
Total 1946-56				52,760	7,320	7,290	67,370	6,440	73,810	13,730

1. Source: Philadelphia Housing Association.
2. "NA" - Data Not Available.
3. All of these units were reported by the Public Housing Authority to be in multiple unit structures.

Taken from: Institute for Urban Affairs: Changes in the Housing Inventory, Univ. of Penn., June 1, 1957.

TABLE C-XIX

Location of New Construction Within the City of Philadelphia 1955[1]

House Type	Dwelling Units Put Under Permit			
	Area A Wards 35 & 41	Area B Wards 21 22,50	Area C Rest of Philadelphia	Total City
Single Family				
Row	227	423	542	1,192
Semi-Detached	2,269	306	56	2,631
Detached	1,057	142	13	1,212
Total Single Family	3,553	871	611	5,035
Two Family	230	166	98	494
Multi-Family	67	23	210	300
Total-All Dwelling Units	3,850	1,060	919	5,829

1. Source: Philadelphia Housing Association.

TABLE C-XX

Public Housing Units Authorized in Counties of the Philadelphia Standard Metropolitan Area 1946-1956[1]

County	Dwelling Units Authorized
Philadelphia	6,442
Bucks	22
Chester	60
Delaware	542
Montgomery	234
Burlington	50
Camden	636
Gloucester	0
TOTAL	7,986

1. Figures do not include 1956 public housing starts in the outlying counties.

Source: Institute for Urban Affairs: Changes in the Housing Inventory, Univ. of Penn., June 1, 1957.

TABLE C-XXI

Dwelling Units Started by Intended Price or Rent
Philadelphia Standard Metropolitan Area
First Quarter, 1954, 1955, 1956

A. Sales Housing

Intended Price	Percentage Distribution 1954	1955	1956
Under $10,000	28	*	3
$10,000 to 11,999	27	12	20
$12,000 to 14,999	30	62	58
$15,000 to 19,999	11	19	14
$20,000 and over	2	3	5
Unknown	2	4	*
TOTAL	100	100	100

* Less than 0.5 of 1 percent

B. Rental Housing, First Quarter, 1956

Intended Contract Rent	Number	Percent
Under $80	20	9
$80 to 99	30	14
$100 and over	170	77
TOTAL	220	100

Source: Unpublished data of the Bureau of Labor Statistics.

Taken from: Institute for Urban Studies, Demand for Housing in Eastwick, University of Penn., 1960.

TABLE C-XXII

NEW SINGLE-FAMILY HOUSE PRICES
CITY OF PHILADELPHIA, 1924-1951

Year	Average Price*	Year	Average Price*
1924	$8,470	1941	$4,690**
1925	8,420	1942	4,690
1926	7,530	1943	5,250
1927	7,100	1944	5,250
1928	6,550	1945	8,990
1929	6,340	1946	8,250
1930	6,540	1947	9,250
1931	5,930	1948	9,290
1932	5,470	1949	8,500
1933	5,390	1950	9,300
1934	5,640	1951	10,450
1935	5,960	1952	NA
1936	6,930	1953	NA
1937	6,090	1954	11,600
1938	5,810	1955	13,400
1939	5,260	1956	13,100
1940	4,650		

*1924-1940: Mean Price
1941-1951: Median Price

**$5,045 = Mean price for 1940

Sources: 1924-1951: Philadelphia Housing Association.
1954-1956: Estimates by the Institute for Urban Studies staff based on data provided by the Bureau of Labor Statistics.

Taken from: Institute for Urban Studies: Major Statistical Indicators at the Philadelphia Housing Market, Univ. of Pennsylvania.

TABLE C-XXIII

RESIDENTIAL CONVERSIONS AND DEMOLITIONS,
CITY OF PHILADELPHIA, 1921-1956
(Figures are dwelling units added to stock by conversion or subtracted from stock by demolition)

Year	Conversions[1]	Demolitions	Conversions Minus Demolitions
1921	207	247	-40
1922	1,012	1,111	-99
1923	926	988	-62
1924	1,226	1,085	+141
1925	1,211	715	+496
1926	1,061	500	+561
1927	968	710	+258
1928	633	536	+97
1929	703	917	-214
1930	388(610)	1,032	-644
1931	199(313)	814	-615
1932	368(578)	1,362	-994
1933	237(372)	1,109	-872
1934	261(410)	1,540	-1,279
1935	547(858)	2,217	-1,664
1936	892(1,458)	1,427	-529
1937	1,235(1,940)	3,121	-1,886
1938	1,453(2,273)	1,890	-437
1939	1,827(2,825)	2,452	-625
1940	3,413	867	+2,546
1941	3,537	775	+2,762
1942	3,508	461	+3,047
1943	2,646	330	+2,316
1944	1,723	231	+1,492
1945	1,533	210	+1,323
1946	3,284	201	+3,083
1947	3,498	343	+3,155
1948	4,435	266	+4,169
1949	4,858	394	+4,464
1950	5,048	424	+4,624
1951	4,203	163	+4,040
1952	3,950	526	+3,424
1953	3,688	1,094	+2,594
1954	1,958	2,243	-285
1955	1,628	2,700[3]	-1,072
1956	4,000[2]	1,800[3]	+2,200

Source: Philadelphia Housing Association
Taken From: Institute of Urban Studies: Changes in the Housing Inventory

1. Reported structural and nonstructural conversions. Figures in parentheses are estimates of unreported conversions in Housing in Philadephia, 1939-1940, Philadelphia Housing Association, 1941.
2. Includes unauthorized conversions from earlier years which were not discovered until 1956.
3. Estimated by Institute Staff.

TABLE C-XXIV

Net Gain or Loss of Dwelling Units by Other Than New Construction
Philadelphia and Standard Metropolitan Area, April 1950-December 1956

	PHILADELPHIA			PHILADELPHIA STAND. MET. AREA		
	Mergers, Conversions (Net)	Demolitions, Withdrawals (Net)	Total	Mergers, Conversions (Net)	Demolitions, Withdrawals (Net)	Total
TYPE STRUCTURE						
1 Family	-2,000	-6,7000	-8,700	-2,300	-14,600	-16,900
2-4 Family	7,500	-2,600	4,900	12,200	- 3,800	8,400
5 Family &over	3,900	-3,800	100	3,500	= 4,500	- 1,000
TOTAL	9,400	13,100	-3,700	13,400	-22,900	- 9,500
TENURE - 1950						
Owner	1,900	-2,500	- 600	3,100	- 7,100	-4,000
Renter	4,400	-9,300	-4,900	5,800	=13,100	-7,300
Vacant	3,100	-1,300	1,800	4,500	2,700	1,800
TOTAL	9,400	-13,100	-3,700	13,400	-22,900	-9,500

Source: Derived from 1956 National Housing Inventory, U.S. Bureau of the Census

Taken from: Institute for Urban Studies: Demand for Housing in Eastwick, University of Penn., 1960

TABLE C-XXV

VACANCY RATES IN SELECTED BLOCKS
BY 1950 AVERAGE MONTHLY RENT OF BLOCK
CITY OF PHILADELPHIA, 1950, 1954, 1955

1950 Average Monthly Rent of Block	1950	1954	1955
Under $25.00	1.5	2.2	5.0
$25.00-$49.99	1.3	2.6	4.2
$50.00-$74.99	1.0	1.4	2.1
$75 and over	1.4	0.6	1.2

Source: Institute for Local and State Government, University of Pennsylvania.

The blocks represented by the figures are not the complete sample of blocks for 1954 and 1955 because the sample includes some blocks developed since 1950.

Taken from: Institute for Urban Affairs: Changes in the Housing Inventory, Univ. of Penn, June 1, 1957.

TABLE C-XXVI

New Construction by Sectors and Access Zones;

1950-1956*

Sector	Number	Percent of SMA
I	67,976	34.0%
II	32,309	16.1%
III	29,234	14.6%
IV	24,564	12.3%
V	8,763	4.4%
VVI	23,789	11.9%
VII	12,891	6.5%

Access Zone	Auto	% Total Cumulative	Mass Transit	% Total Cumulative
0-15 min.	7637	3.8	17,545	8.9
15-30 min	47,973	27.8	60,663	39.5
30-45 min	80,139	67.8	65,004	72.3
45-60 min	44,623	90.1	39,294	92.2
60plus min	19,801	100+	15,812	100+

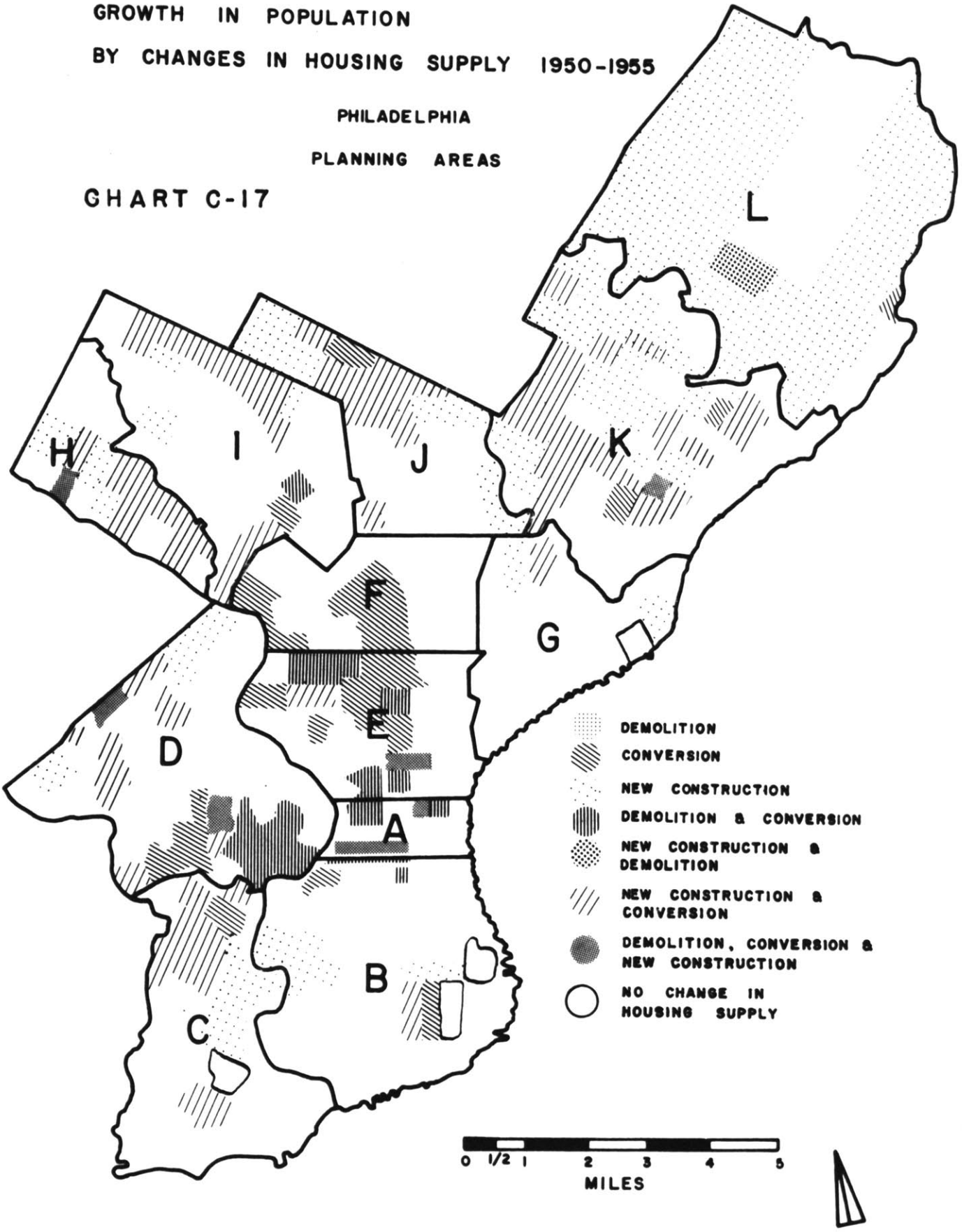
Source: Estimates of Population and Dwelling Units in Philadelphia, April 1, 1955: Philadelphia City Planning Commission, William Hansen, Residential Extension in a Metropolitan Region. An unpublished doctoral dissertation in planning at the University of Pennsylvania, 1961.

GROWTH IN POPULATION
BY CHANGES IN HOUSING SUPPLY 1950-1955

PHILADELPHIA

PLANNING AREAS

CHART C-17



DECLINE IN POPULATION
BY CHANGES IN HOUSING SUPPLY 1950–1955

PHILADELPHIA

PLANNING AREAS

CHART C-18

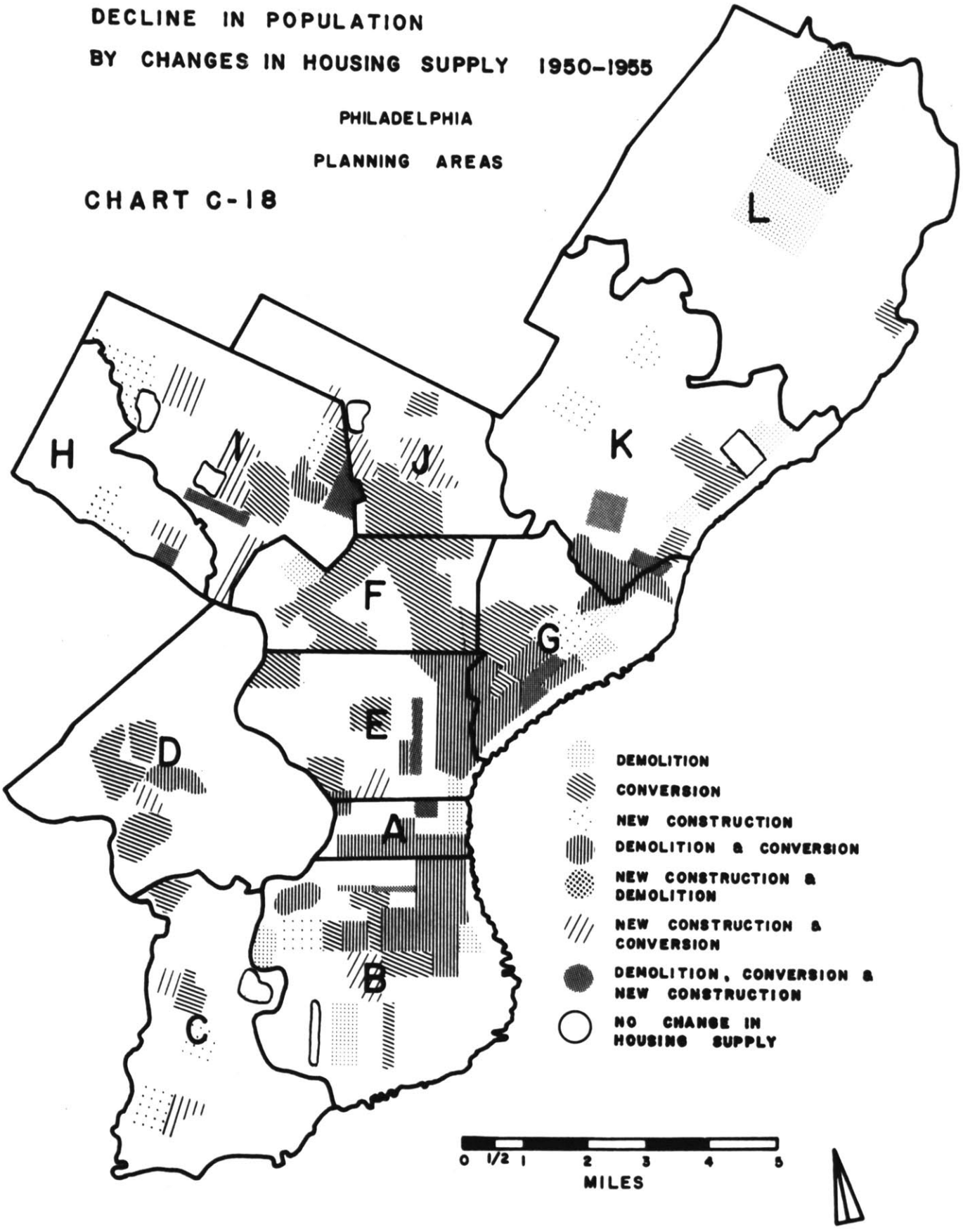
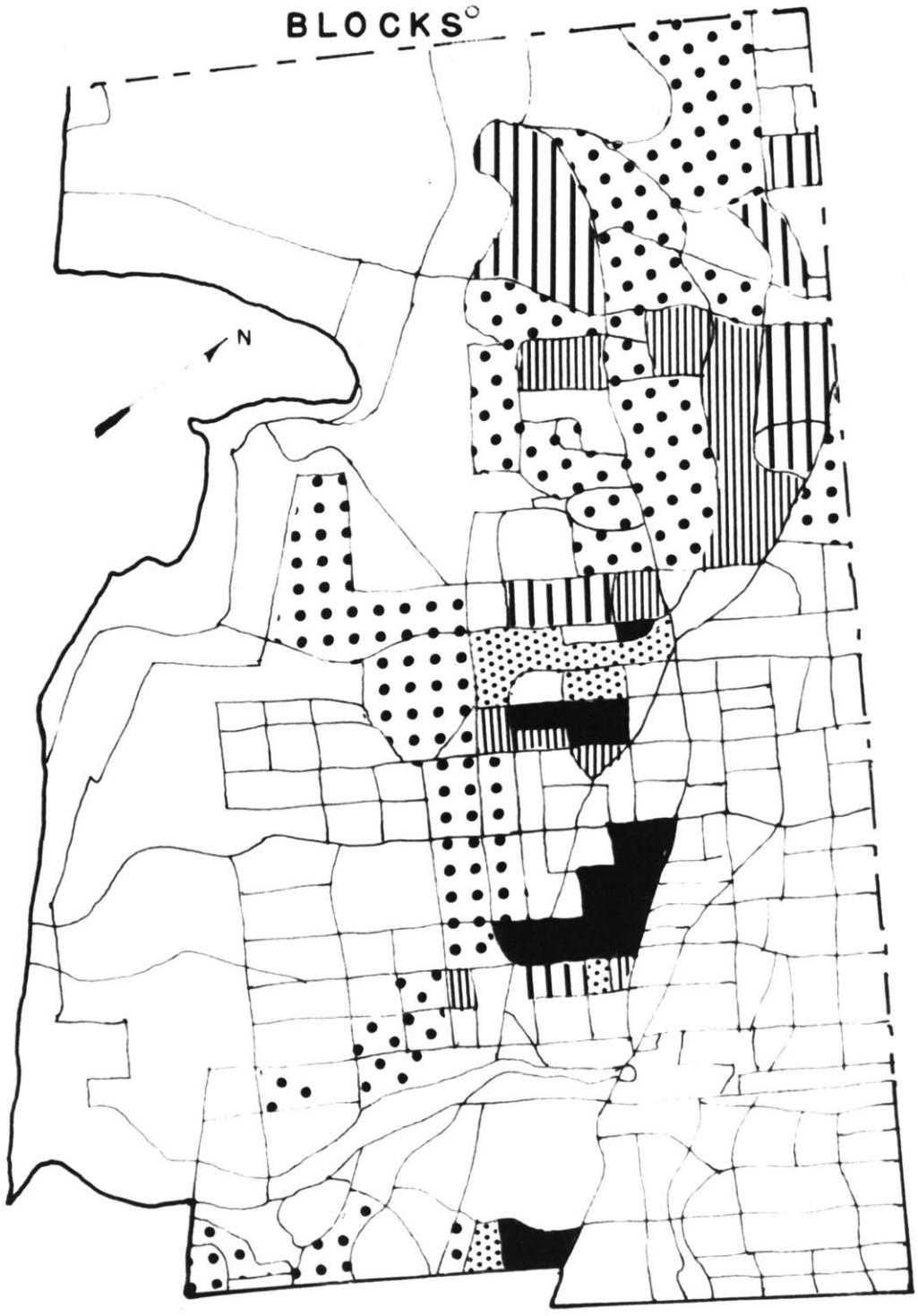


CHART C-19: VALUE OF HOUSING BY BLOCKS°



U.S. CENSUS, 1950

APPENDIX C - 1

Time Distances from Planning Analysis Areas to the CBD

	Automobile		Mass Transit
	Urban Traffic Transportation Board Definition	National Housing Inventory Definition	Urban Traffic Transportation Board Definition
Philadelphia			
A	1	18	--
B	8	26	10
C	21	40	27
D	17	31	23
E	7	33	12
F	13	35	13
G	22	46	22
H	20	36	22
I	25	36	22
J	25	43	18
L	46	28	25
L	39	56	31
Bucks			
1	47	57	42
2	56	57	49
3	61	57	54
4	51	57	45
5	65	57	55
6	55	57	51
7	63	57	67
8	67	57	98
9	75	57	70
10	74	57	58
11	80	57	79
12	101	57	101
Montgomery			
1	27	42	15
2	34	42	33
3	35	42	25
4	47	42	42
5	45	42	40
6	48	55	40
7	43	42	32
8	61	55	40
9	61	55	53
10	63	55	66
11	81	55	70
12	87	55	72

APPENDIX C - 1 (cont'd.)

	Automobile		Mass Transit
	Urban Traffic Transportation Board Definition	National Housing Inventory Definition	Urban Traffic Transportation Board Definition
Chester			
1	53	60 plus	37
2	61	60 plus	56
3	82	60 plus	70
4	63	60 plus	48
5	80	60 plus	60
6	90	60 plus	110
7	85	60 plus	85
8	64	60 plus	64
9	93	60 plus	93
10	97	60 plus	97
11	93	60 plus	93
Delaware			
1	39	42	24
2	34	42	15
3	30	42	12
4	39	42	24
5	47	44	43
6	41	44	34
7	58	44	56
8	49	44	42
Camden			
1	18	39	22
2	29	38	35
3	27	38	40
4	37	38	50
5	53	38	60
6	21	39	25
Burlington			
1	31	44	45
2	40	44	60
3	52	44	90
4	42	44	50
5	56	44	85
6	45	44	60
7	68	44	n.a.
Gloucester			
1	33	48	45
2	45	48	70
3	48	48	60
4	58	48	82

Source: Urban Traffic and Transportation Board, Technical Memorandum, #3, Table 17. Louis Lowenstein: Twoard a Theory of the Journey to Work, Appendix, Table VII.

APPENDIX C-2

INDEX OF SIMILARITY FOR SELECTED

PLANNING ANALYSIS AREAS IN SECTOR

III AND VI

	Montgomery PAA 1.	Delaware PAA 1.	Chester PAA 1.	Chester PAA 2.	Chester PAA 8.	Chester PAA 7.	Camden PAA 3.	Camden PAA 4.	Camden PAA 5.	Burlington PAA 7.
Housing										
Pre 1919	6.9	3.6	8.6	10.1	12.5	10.3	4.2	6.25	8.26	7.6
Over 5 D.U.'s.	11.8	.04	-	10.1	-	6.1	.36	-	-	-
Occupation										
Professionals	22.0	10.0	7.2	9.2	5.2	3.9	8.3	3.1	1.96	-
Clericals	9.2	5.2	4.1	6.4	3.33	3.2	5.0	4.3	2.0	-
Craftsman	4.3	4.0	4.4	4.23	5.0	5.5	6.0	7.3	5.2	2.9
Operatives	2.2	1.5	3.1	3.15	4.42	4.5	2.6	5.1	7.5	2.6
Laborers, except farm	6.3	3.14	8.2	9.7	12.5	8.82	2.9	4.1	12.3	16.4
Age Structure under 14	18.8	9.8	10.0	9.1	9.3	9.8	10.7	11.25	10.0	9.4
Russian Born	-	-	-	-	-	1.9	-	-	-	-
Non-white	.45	2.0	6.0	9.2	2.1	4.5	3.6	2.4	6.82	1.8

Source: 1950 U.S. Census of Population Bulletin P-D42.

Footnotes

Chapter I:

1. It is important that this conceptual framework not be imposed upon the material in any arbitrary fashion. If it were, the insights would reflect the framework instead of the theories or variables. The logical distinction resembles the traditional Aristotelean. separation of form and matter. The reality of an object - in this case the distribution of residential space in metropolitan areas and the theories concerning it - is composed of both the material of which the object consists and the form imposed upon that material. If the form does not express the relationships inherent in the material, the real meaning of the material is negated.

2. Location might possibly be conceived as another concept but it is implicit in both scale and the distribution of variables within this scale.

3. Peter H. Rossi: Why Families Move, The Free Press, Glencoe, Illinois, pp.85.

4. Louis K. Lowenstein: Towards A Theory of the Journey to Work, an unpublished doctoral dissertation in planning at the University of Pennsylvania, Chapter IV, pp. 28.

5. As defined here, the perception of space and time by groups and individuals within various cultures and sub-cultures becomes a variable influencing their demand for residential space. The distinction is not in space-time but in its perception.

6. Walter Firey: Land Use in Central Boston, Cambridge, Harvard University Press, 1947, pp. 84-85.

7. This is not to say that the metropolitan area as defined by the Census is the best definition. It is to say that it is the most realistic statistical definition we have at present.

8. This may seem obvious but it needs to be stated for it has been neglected by certain approaches.

9. Walter Firey: op.cit., pp. 324.

10. Lloyd Rodwin: Housing and Economic Progress, Harvard University Press and the Technology Press of the Massachusetts Institute of Technology, 1961, pp. 162.

11. Access zones are to be used instead of rings because they can be so precisely defined.

12. These pPlanning Analysis Areas are groupings of census tracts made by the various planning bodies in the region for the purpose of organizing data.

Footnotes: Chapter 2.

1. This statement denies, of course, that there are some people in the metropolitan area who do not work - because they do not have to or because they do not need to. Other variables - as indicated in the next section - are needed to describe their locational needs. Moreover, there are also those workers who commute a longer distance than any normal span includes. Their existence must be recognized in any theoretical statement.

2. Unfortunately, blocks and census tracts as far as valuation and rent are concerned could only be compared in the central city, due to limitations upon data. One of the more valuable pieces of information would be to have the same variable organized at the several scales throughout the metropolitan area.

3. U. S. Department of Commerce, Bureau of Census: 1950 U.S. Census of Population and Housing, Bulletin P-D 42 and H-E 143.

4. Arthur B. Gallion and Simon Eisner: The Urban Pattern , D. Van Nostrand Company, Inc., Princeton, New Jersey, 1950, Chapter 21.

5. a. D. J. Foley, " Use of Local Facilities in a Metropolis," American Journal of Sociology , Volume 58, pp. 238-246.

   b. Byron Munson, " Attitudes toward Urban and Suburban Residence in Indianapolis, " Social Forces, Volume 35, pp. 78 - 88.

   c. Svend Riemer, John McNamara, " Contact Patterns in the City, " Social Forces, Volume 36, pp. 137 - 145.

6. See, for example, Festinger, et al: Social Pressure in Informal Groups, Harper and Brothers, New York, 1960 and William H. Whyte, Jr., The Organization Man, Doubleday and Company, Garden City, New York, 1957, especially part seven.

7. D. J. Foley, op. cit.

8. Eunice and George Grier: Privately Developed Interracial Housing, University of California Press, Berkley and Los Angeles, 1960.

9. For the period under consideration at least.

10. This radius also varies according to the socio-economic characteristics listed in Appendix C - II.

11. Walter Firey: op. cit, pp. 278.

12. For example, a land use map.

13. See recemt writings of David Reisman.

FOOTNOTES

Appendix A:

1. Homer Hoyt: The Structure and Growth of Residential Neighborhoods in American Cities, Federal Housing Administration, Washington, D.C., 1939, p. 28, p. 56.
2. Ibid., p. 73.
3. Ibid., p. 75.
4. Ibid., pp. 75-76.
5. Ibid., p. 71.
6. Ibid., p. 88
7. Ibid., p. 92
8. Ibid., P. 92
9. Ibid., p. 104.
10. Ibid., Chapter III.
11. Ibid., Chapter IV.
12. Ibid., p. 116.
13. Ibid., p. 122.
14. Edgar M. Hoover and Raymond Vernon: Anatomy of a Metropolis, Harvard University Press, Cambridge, Mass., 1960, pp. 181-182, 190-207.
15. Ibid., p. 192.
16. Ibid., p. 127.
17. Ibid., p. 145.
18. Ibid., pp. 145-150.
19. Ibid., Table 38 and Table 41.
20. Ibid., p. 233.

Footnotes (continued)

21. Ibid., p. 220.

22. Oscar Handlin: The Newcomers, Harvard University Press, Cambridge, Mass., 1960, p. 92.

23. Edgar M. Hoover and Raymond Vernon: op.cit., p. 211.

24. Ibid., p. 212.

25. Oscar Handlin: op. cit., p. 68.

26. Edgar M. Hoover and Raymond Vernon: op. cit., p. 238.

27. Walter Firey: Land Use in Central Boston, Harvard University Press, Cambridge, Mass., 1947, Chapter Two.

28. Walter Firey, Ibid, p. 79.

29. Ibid., p. 79.

30. Ibid., p. 84.

31. Ibid., p. 324.

32. Ibid., pp. 113-133.

33. Ibid., p. 273.

34. Ibid., p. 179.

DISCLAIMER

Page has been ommitted due to a pagination error by the author.

Footnotes (continued)

Appendix C:

1. Urban Traffic and Transportation Board: Technical Memorandum #3. Table 17, p. 114. Another set of time-distance data was also obtained from an unpublished doctoral dissertation by Mr. Louis Lowenstein. This set was rejected for defining access zones as time-distance was aweighted mean which had been determined by weighting actual travel time by the average number of work-trips taken into each district. Consequently, it is not comparable to the time-distance used by Vernon-Hoover which was based upon commuter tables. Both automobile and mass transit time-distance were used in the thesis because it was felt that both modes of travel should be investigated.

2. It is possible that organizing the data by Planning Analysis Areas may be partially responsible for this skewed pattern. However, the weighted-time distance defined by Mr. Lowenstein and contained in Appendix C-1 also indicates a similar pattern.

3. Outside of the cities of Chester, Camden, and Philadelphia, all housing data is by census tracts.

4. Homer Hoyt: op.cit., p. 72.

5. Homer Hoyt: op. cit., p. 72.

6. Philadelphia City Planning Commission: Housing in Philadelphia and Its Metropolitan Area, pp. 12-13.

7. E. Digby Baltzell: Philadelphia Gentleman, Free Press, Glencoe, Illinois, 1958.

8. All population figures for 1940 and 1950 are taken from the U.S. Census, Figures for 1955 taken from population estimates contained in Technical Memorandum Number 3, Urban Traffic and Transportation Board.

9. Institute of Urban Studies: Industrial Land Facilities for Philadelphia, Philadelphia City Planning Commission, Philadelphia, Pennsylvania, 1956.

10. All information concerning journey to work was obtained from The National Housing Inventory Survey, Philadelphia Supplement, 1946. Though the areas outside the central city utilized to organize data are not exactly comparable to the PAA's., the information still has important significance.

11. Though some of this differentiation between the core and the periphery is based upon the scale - the peripheral areas are so much larger than the central areas, workers in the periphery still tend to be less dispersed through the metropolitan area in terms of their jobs.

Footnotes (continued)

(Appendix C - continued)

12. Louis Lowenstein: Toward a Theory of the Journey to Work, and unpublished doctoral dissertation in planning, University of Pennsylvania, Philadelphia, Pa., 1961.

13. Ibid., Chapter 5.

14. Ibid., p. 86.

15. U.S. Department of Commerce, 1950 Census of Population, Bulletin P-D42, p.8.

16. E. Digby, Baltzell, op.cit.

17. Ibid., p. 182.

18. Ibid., Chapter XI.

19. Data for Italians mapped but not included in the thesis as it resembles that for the Russians.

20. E. Digby, Baltzell, op.cit., p. 208.

21. E. Digby, Baltzell, op.cit., p. 208.

22. Chester Rapkin and William G. BGrisby: The Demand for Housing in Racially Mixed Areas, University of California Press, Berkley, and Los Angeles, 1960, p. 6.

23. Ibid., especially pp. 25-31.

24. Ibid., Out of 2340 purchases in the study areas, 320 whites purchased on a block adjacent to Negroes; 119 white purchased on mixed street fronts.

25. Population Trends in Center City, a release printed by the Philadelphia Housing Association, Feb. 12, 1961.

26. An unpublished manuscript concerned with residential mobility in Philadelphia. Written by the staff of the Institute for Urban Affairs, and based upon data gathered from the National Housing Inventory, Philadelphia Supplement, 1956.

27. Redevelopment Authority of the City of Philadelphia: Annual Report, 1959.

Footnotes (continued)

(Appendix C continued)

28. Ibid., pp. 46-47.

29. Unpublished material obtained from Philadelphia Housing Association.

30. Interview with research director of the Philadelphia Housing Association.

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5. Walter Firey: Land Use in Central Boston, Cambridge, Harvard University Press, 1947.

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7. Edgar Hoover: Anatomy of a Metropolis, Harvard University Press, Cambridge, Mass., 1959.

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9. Oscar Handlin: The Newcomer, Harvard University Press, Cambridge, 1959.

10. Berman, Chintz, and Hoover: Projection of a Metropolis, Harvard University Press, Cambridge, 1959.

11. Mitchell and Rapkin: Urban Traffic; A Function of Land Use, Columbian University Press, New York, 1954.

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19. Lloyd Rodwin: Suggestions for research on the Spatial Distribution of Activities in Metropolitan Regions, University of California, Berkley, 1953.

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